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A RAPID ASSAY OF HYDROGEN PEROXIDE.

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Hydrogen peroxide as a therapeutic agent has been known for many years, but its ready decomposition for a long time proved a barrier to its general introduction; this decomposition into water, and, for the time being, active oxygen, upon which its medicinal use depends, takes place so readily at moderate temperatures that it is impossible to guarantee the strength of the solution, even if taken from a freshly opened bottle.

Hydrogen peroxide has been called a specific in diphtheria, and other throat affections, and the responsibility of the pharmacist is apparent when the so-often fatal termination of these affections is considered; as a proof of this may be cited a case in which a physician prescribed an original four-ounce bottle of this remedy, the druggist, however, dispensing four ounces from a pound bottle opened a few days previously; the disease proving fatal, enabled the physician, apparently without an examination of the dispensed hydrogen peroxide, to insinuate that if the prescription had been dispensed as written, the patient might have recovered. Had the hydrogen peroxide by assay been found of good quality, the druggist could not have been reproached for dispensing the remedy from a pound bottle.

The practice of prescribing portions only of remedies put up in larger sized bottles, results in filling the shelves of the store, as so often the first prescription for a special remedy, also happens to be the last. The majority of cases in which hydrogen peroxide was

found inefficient, was no doubt due to the use of a decomposed article. The object of this paper is to give a method for determining the value of hydrogen peroxide, which will enable the pharmacist to make an assay in the course of a few minutes, the method is so expeditious that, if desirable, the assay can be made for each prescription, and the result noted on the prescription; as a rule, however, each bottle when opened, should be assayed, and if the demand be light, either for each prescription or about once a week so as to have a check upon the rapidity of decomposition. To the question, "What is the minimum value of hydrogen peroxide suitable for dispensing?" the answer should come from the practitioner, but the suggestion is here made that the prescription be so written as to show the volume of oxygen which the remedy should contain when it is to be used, thus enabling the pharmacist to give directions for the dilution; if this suggestion be enacted there will result greater uniformity of strength than by dispensing original packages, or by taking the specified quantity from freshly opened bottles, as this is no guarantee that the contents are of the claimed strength. The method of assay depends upon the following reaction and data: $5\ H_2O_2 + K_2Mn_2O_8 + 3\ H_2SO_4 = 5\ (O_2) + 8\ H_2O + K_2SO_4 + 2\ MnSO_4$; as one-half of the liberated oxygen comes from the $K_2M_2O_8$, one molecule of the latter (molecular weight 314) will liberate five atoms of oxygen (weighing 80), coming from the H_2O_2, so that 62·8 grams $K_2Mn_2O_8$ will liberate 16 grams oxygen which, at 0° C. will occupy 11·16 litres or at 20° C. (an average temperature) almost 12 litres or 12,000 cubic centimetres; 1 cc. oxygen at 20° C. therefore is liberated by the use of 0·00525 gm. $K_2Mn_2O_8$. 2·625 gm. $K_2Mn_2O_8$, dissolved in sufficient distilled water to make a litre of solution, will liberate, under proper conditions, 500 cc. oxygen from H_2O_2, so that 1 cc. of this solution represents 0·5 cc. oxygen. [Solution of permanganate of potassium, containing 3 grams per litre has repeatedly been shown to be permanent for a long time (Am. Journ. Pharm., 1892, 565); so there is no difficulty in keeping this solution made up, provided it be protected from dust and light.]

In using this solution it was soon found that variable results could be obtained if the assay was made in the presence of only a small quantity of water; the more rapidly the permanganate was added, the more it would take; added slowly it required less, the

explanation being that the sulphate of manganese produced has the power of decomposing H_2O_2 and hence, the slower the $K_2Mn_2O_8$ added, the greater the decomposition by the sulphate and the less $K_2Mn_2O_8$ required. By carrying out the assay in presence of a large excess of water, reliable and uniform results are obtained; to 500 cc. water (river water will answer) in a capsule add 5 cc. dilute sulphuric acid and sufficient permanganate solution to give a pink tint (this counteracts any reducing action which the river water may have on the permanganate solution); now add 5 cc. of the hydrogen peroxide and then (from a bottle or graduate containing 175 cc.) allow the permanganate solution to run in in a thin stream, stirring constantly until the pink color is no longer discharged; the pink color after a short time is replaced by a brownish color or precipitate (MnO_2H_2O) due to the action of manganous sulphate upon the slight excess of permanganate; measure the permanganate solution remaining in the bottle or graduate and divide the permanganate used by 10, the result will be the volume of oxygen liberated by one volume H_2O_2.

To dispense entirely with the metric system, a solution can be made by dissolving 38·5 grains potassium permanganate in a quart of distilled water (this solution (0·264 per cent. $K_2Mn_2O_8$ is almost of the same strength as the one just described containing 0·2625 per cent. K_2Mn_2O; one fluidrachm of the permanganate solution liberates one-half fluidrachm of oxygen at 20° C. In the assay the following measures should be substituted for the ones described: one fluidrachm each of hydrogen peroxide and dilute sulphuric acid, one pint river water and then add the permanganate solution from a bottle or graduate containing four fluidounces; the number of fluidrachms of permanganate solution used divided by 2 gives the volume of oxygen liberated by the H_2O_2.

Five cc. of a sample opened several times during three months required 38 and 36 cc. $K_2Mn_2O_8$, showing 3·8 and 3·6 volumes; one fluidrachm of the same sample required 7, 7¾ and 7¾ fluidrachms permanganate, or 3·5, 3·8 and 3·8 volumes oxygen (the first assay was made in presence of only 2 ounces of water).

An original ½ lb. bottle, purchased in a retail store, by assay, using the chlorinated soda method (Am. Journ. Pharm., 1892, 126) and measuring the evolved oxygen, gave 12·5, 12·4 and 12·5 volumes oxygen; there was no pressure in the bottle when opened,

showing that no decomposition had taken place after bottling. The H_2O_2, labelled as 15 volumes, therefore contained less than was claimed before bottling. This sample tested by the permanganate method gave 12·7 and 12·8 volumes; three days later 12·85 volumes. The slightly higher results by this method are very probably due to the permanganate not being standardized, the solution being made from commercial crystals; but for the use of the pharmacist the method combines sufficient accuracy with rapidity, and these are the requirements.

Another sample (1 lb. bottle) upon opening gave evidence of slight pressure, indicating very probably some decomposition; assayed at once it yielded 12·8 volumes; after five days no change had taken place. The temperature of the room in which the solutions were kept was never above 20° C. and very frequently considerably below this temperature, so that as far as the temperature was concerned little alteration in the strength of the samples was to be expected. The bottles were frequently opened and portions of the peroxide removed during the time between the various assays.

GLEANINGS FROM THE GERMAN JOURNALS.

By Frank X. Moerk, Ph.G.

Pulverulent medicinal soaps.—Dr. P. J. Eichhoff recently recommended the use of this class of soaps, because of the ease with which medicinal substances could be incorporated. By boiling soda solution and beef suet together a neutral soap is produced which is placed upon the market as a fine, anhydrous although hygroscopic powder; this forms the basis for all of the soaps and is called *neutral soap-powder base;* by the addition of 2 per cent. oleic acid, and 3 per cent. lanolin, a base is obtained, containing *free* or *excessive fat;* by the addition of 2·5 per cent. each of potassium and sodium carbonates are *alkaline soap-powder base* results. The following preparations may be incorporated with anyone of the three bases: 20 per cent. pumice stone; 10 per cent. sulphur, balsam of Peru, chlorinated lime, chrysarobin; 5 per cent. salicylic acid, β-naphthol, camphor, borax, pyrogallol, menthol salol, tannin, thiol, naphthalin; 3 per cent. benzoin, iodoform, iodol; 2 per cent. thymol, iodine, aristol, europhen, quinine sulphate; 0·2 per cent. cantharidin. More than one medicinal ingredient may be used as

is indicated by the following: Salicylic acid and resorcin, 5 per cent. each; salicylic acid and sulphur, 5 per cent. each; salicylic acid, resorcin and sulphur, 5 per cent. each; camphor, 2 per cent. and sulphur, 5 per cent.; camphor, 2 per cent. sulphur, 5 per cent. and balsam of Peru, 10 per cent.; β-naphthol and sulphur, 5 per cent. each; mercuric chloride, 2 per cent. and sodium chloride, 1 per cent.—(*Therap. Monatsh*) *Pharm. Ztg.*, 1892, 736.

Cancroin is obtained by Dr. Adamkiewicz from cancer tissue, upon which *Coccidium sarkolytus* is parasitic. Cancroin is a functional product, and as such presents protection against the parasite itself. It has a remarkable similarity, physically and physiologically, to the ptomaines, especially to *neurine*, and the latter could replace cancroin in its specific action towards the cancer-cell; it is possible that the two substances are identical. This name *cancroin* is not only given to the poison in the cancerous tissue, but also to a solution containing 25 per cent. *neurine* neutralized with citric acid, then saturated with carbolic acid and, lastly, diluted with twice its volume of water.—*Pharm. Ztg.*, 1892, 755.

Artificial camphor.—Terebenthen, obtained in the distillation of turpentine, is saturated with hydrochloric acid gas; the two isomers produced, one solid, the other liquid, are separated, as only the former is available for the production of camphor. This is then mixed with an alkaline carbonate, and heated in a still to about 120° C. to produce and vaporize the hydrocarbon, camphene, $C_{10}H_{16}$; in the form of vapor, camphene is acted upon by ozone or ozonized air, whereby the hydrocarbon takes up oxygen, forming camphor, $C_{10}H_{16}O$. The camphor is compressed, melted or subjected to distillation.—(German Patent), *Pharm. Ztg.*, 1892, 756.

Commercial basic bismuth salicylate.—The variable composition is seen from the analyses of six brands, made by Dr. F. Goldmann. The moisture and free salicylic acid varied between 0·11 and 5·07 per cent., and the bismuth oxide between 57·84 and 72·34 per cent. Two of the salts contained 11·93 and 20·20 per cent., respectively, of bismuth subnitrate. The recommendation is made that future Pharmacopœias give processes for making the salt so as to insure a more uniform product.—*Pharm. Ztg.*, 1892, 797.

Alkalinity of sodium acetate.—The varying statements regarding the reaction of sodium acetate in aqueous solution led Dr. F. Colli-

schonn to prepare sodium acetate from perfectly neutral and also from distinctly acid solutions; the action towards litmus paper and even towards phenolphthalein proved that the solution of the salt is *alkaline* to both indicators and that the salt could contain small quantities of free acetic acid without changing the result. In the titration of acetic acid with sodium hydrate solution neither of these indicators will give *exact results.* Fifty grams sodium acetate (containing no free acetic acid) dissolved in 50 grams water required in cold solution 1 cc. $\frac{n}{10}$ hydrochloric acid to give neutral reaction towards phenolphthalein; if the solution be boiled, 3 cc. more of the acid must be added to give neutral reaction. The addition of 4 cc. acid to this solution still gave a liquid having alkaline reaction tested with litmus or turmeric paper. To test the acetate for carbonate it is recommended to dissolve 10 gm. of the salt in 100 gm. of water, and add 1–2 drops phenolphthalein solution; in the absence of carbonate of sodium one drop *n*-hydrochloric acid will decolorize the solution.—*Chemiker Ztg.*, 1892, 1921.

Cholera-culture reaction.—If to a cholera-culture in gelatin or beef-tea a small quantity of concentrated sulphuric acid be added a red coloration appears, frequently called the cholera-red reaction. A study of the conditions of the reaction shows it to be due to the action of *indol* upon *nitrous acid* produced by the reducing action of the comma-bacillus from nitrates present in the nourishing medium. A series of experiments prove that this cholera test is superior to other known tests for nitrous acid (diphenylamine, sulphanilic acid and naphthylamine, and potassium iodide, starch and hydrochloric acid). The red color with the cholera-culture is interfered with by an excess of pepton, the presence of 2 per cent. pepton completely preventing the coloration, but upon the addition of a little *nitrite* it becomes apparent. The larger the quantity the *indol* present the deeper red the color, small quantities of nitrite answering as well as larger quantities. As a test for *nitrous acid* in the presence of considerable organic matter, *indol* in the presence of sulphuric acid forms the most delicate test.—M. W. Beyerinck (*Centralbl. f. Bakt., etc.,*) *Apotheker Ztg.*, 1892, 666.

Action of hydrogen sulphide upon the organism.—By an elaborate investigation is established that the inhalation of 0·07 per cent. to 0·08 per cent. H_2S in the atmosphere produces in man, in the

course of a few hours, very dangerous symptoms; the presence of 0·1 to 0·15 per cent. causing death quite rapidly. The odor of H_2S, if present to the extent of 0·02 to 0·03 per cent. is not as powerful and unpleasant as if present in smaller quantity. 0·015 per cent. H_2S in the air can be inhaled for some hours without detriment; but more than 0·02 per cent. produces injurious effects. The system cannot be made to tolerate this gas; on the contrary, it becomes more sensitive upon repeated inhalations.—K. B. Lehmann (*Arch. f. Hygien.*), *Apotheker Ztg., Repert.*, 1892, 108.

Tests for phenacetin, methacetin and hydracetin.—Saturated, aqueous solutions of *phenacetin* and *methacetin*, diluted with an equal volume of chlorine water, upon addition of a few drops of ammonia develop a red or brown color; the color with methacetin develops quicker and is more intense than with phenacetin. The addition of 5–10 per cent. quinine sulphate to these substances produces in the test a beautiful blue color; the test succeeds best if about 0·1 of the mixture be agitated with 5 cc. water, 8–10 drops chlorine water, and lastly, 2–3 drops ammonia water be added. Hydracetin with chlorine water gives a yellow color, intensified by the addition of ammonia; in the presence of the quinine sulphate a fine red color results. Other substances like acetanilid and exalgin themselves give no coloration, and in the presence of quinine sulphate give only the green color due to the latter; morphine, which with chlorine water alone or with ammonia, gives a yellow coloration in the presence of quinine sulphate, develops only a green color.—T. Gigli; *Chemisches Repert.*, 1892, 368.

Tolypyrine.—This derivative of antipyrine is *p*-tolyl dimethylpyrazolon, and differs from antipyrine by containing an additional methyl group introduced into the phenyl radical. This compound unites with salicylic acid just as does antipyrine (to form salipyrine) and the resulting salt is commercially called *tolysal;* it forms colorless crystals melting at 101–102° C., difficultly soluble in water, but easily soluble in alcohol.—*Pharm. Ztg.*, 1892, 750 and 764.

Cinchona assay —As an improvement upon Haubensack's method (Am. Jour. Pharm., 1891, 347) which by Wegmüller was pronounced to be the best method yet proposed, C. Kürsteiner publishes the following and invites comparison of the two methods: 20 grams cinchona in very fine powder are placed in a flask of 400–500 cc.

capacity and moistened with 5 grams dilute hydrochloric acid (spec. grav. 1·060) and 30 grams strong alcohol; after standing for 2 or 3 hours, 15 grams water of ammonia (10 per cent.) and 170 grams ether are added, and repeatedly agitated during 5–6 hours; 100 grams of the liquid are decanted into a separating funnel of 300 cc. capacity, containing 50 grams water and 2 grams dilute sulphuric acid, sp. gr. 1·117 (or sufficient to impart an acid reaction after agitation with the ethereal solution), agitated repeatedly and then allowed to stand for at least one hour, when the aqueous layer is transferred to a beaker, warmed on a water-bath to 40° C. and returned to the separating funnel, which has been cleaned in the meantime. Ammonia water is carefully added until a distinct alkaline reaction results, and the alkaloids dissolved in a mixture of 30 grams chloroform and 10 grams ether by carefully rotating the funnel; after separating, the chloroform layer is removed to a tared flask, allowing it to filter through a small, plain filter; the extraction of the alkaloids is completed by using a second portion of solvent, 15 grams chloroform and 5 grams ether, allowing it to pass through the filter and washing the latter with chloroform. The solvent is then evaporated upon a water-bath and the residue weighed; multiplying by 10 gives the percentage of total alkaloids.—(*Schwz. Wochenschr. f. Chem. and Pharm.*) *Pharm. Ztg.*, 1892, 750.

Preparation of pure chloroform.—A peculiar method is proposed by R. Anschütz, depending upon the separation of salicylid-chloroform from impure chloroform. Salicylid $C_6H_4<\overset{CO}{O}>$ and also *o*-homosalicylid $CH_3{\cdot}C_6H_3<\overset{CO}{O}>$ remaining in contact with chloroform for 24 hours, form crystallizable almost insoluble compounds with chloroform, the latter being only loosely combined, (comparable with the water of crystallization) and volatilized by very moderate heating. The compounds contain 33·24 per cent. and 30·8 per cent. chloroform, respectively, and can be kept for long periods in closed vessels. By heat the chloroform can be distilled shortly before it is to be used, enabling a guarantee for perfect purity. The salicylid and *o*-homosalicylid can be used over and over in this process. None of the impurities of chloroform have been found to form crystallizable compounds with salicylid or *o*-homosalicylid.—(*Berichte*) *Pharm. Centralhalle*, 1892, 753.

ABSTRACTS FROM THE FRENCH JOURNALS.

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Creasote Pills.—M. Limbo (*Jour. de Pharm. et de Chim.*, Oct., 1892) recommends the following process for these pills, by which he obtains a preparation, having the odor and taste of the creasote completely masked: The creasote is mixed with about twice its weight of pulverized gum arabic, and when the liquid has been well absorbed a few drops of glycerin are incorporated with the mass.—See also Amer. Jour. Pharm., 1889, p. 559; 1890, p. 17; 1891, p. 291; and 1892, pp. 189 and 462.

Antiseptic properties of guaiacol carbonate.—The employment of guaiacol as a pulmonary antiseptic is prevented by its caustic and irritant properties, and the remedy can only be prescribed in small doses. This is not the case with the guaiacol carbonate, which is a well-defined, odorless, tasteless salt, insoluble in water, and has no irritant action on the mucous membranes. It is not toxic and acts as an antiseptic in phthisis; it is found in the urine a half hour after its ingestion.—J. Brissonnet, in *Rép. de Pharm.*, Oct., 1892.

Guaiacol carbonate and creasote carbonate in the treatment of pulmonary phthisis.—The excellent results obtained with guaiacol and creasote constitute these remedies true specifics for phthisis. But as it is necessary to resort to subcutaneous or rectal administration, in order to obtain the necessary doses, M. Chaumier (*Bull. gén. de Thérap.*, Dec., 1892, p. 519, recommends the use of the respective carbonates. He says he has administered 6 gm. a day of the guaiacol salt, while of the carbonate of creasote he has given as much as 5 gm. per day. The author prefers the carbonate of creasote to that of guaiacol, although the latter is a solid and more easily administered, because the creasote salt contains not only the carbonate of guaiacol, but also the carbonates of the other bodies present in the creasote.

Empyreumatic oil of birch.—By dry distillation of *Betula alba*, there is obtained an empyreumatic tarry oil, known by the name "daggett." When rectified it furnishes a slightly colored greenish oil, showing the remarkable property of dichroism. This is known in French commerce as *brown* oil. The empyreumatic oil is used in the manufacture of Russian leather, which owes its peculiar odor to the phenol present in it. In medicinal use it discolors the skin

and finger-nails, and it has been attempted to obtain a lighter and whiter oil, by rectifying the *brown* oil in a current of steam; but it is questionable whether this lighter oil is as valuable therapeutically. There exists, also, an oil known in French commerce, as Pennsylvania oil of birch, which consists largely of methylsalicylic ether.—F. Vigier, in *Journ. de Pharm. et de Chim.*, Oct., 1892.

This latter oil is not obtained from Betula alba, but is prepared by distilling the branches of *Betula lenta* or sweet birch, with water.—(Translator).

Emulsion of coal tar oil as a substitute for cresyl.—The high price of cresyl induced M. Delahousse (*Jour. de Pharm. et de Chim.*, Nov., 1892) to replace this by an emulsion of heavy coal tar oil (huile lourde de houille) obtained by the following formula: coal-tar oil, (density 1·05), 50; pulverized colophony, 10; soda lye (sp. gr. 1.33), 6; green soap, 10. A syrupy liquid results having the odor of cresyl, and acting like it in the presence of water. This preparation contains about 740 gm. of coal-tar oil per litre, and is equal to cresyl in antiseptic and deodorizing properties.

Sodium paracresotate in infantile diarrhœa.—According to Demme and Loesch (*Rev. gén. de Clin. et de Thér.*, 1892) sodium paracresotate acts as an internal antiseptic, disinfecting the stools and diminishing their frequency. The maximum doses are the following: under two years of age, 50 cgm. per day; to four years, 1 gm.; to ten years, 3 gm. It should be prescribed in small doses and gradually increased.

Demme's formula for the treatment of diarrhœa in infants is the following: Paracresotate of sodium, 0·10 gm.; tincture of opium, 2 drops; brandy, 1 gm.; syrup of acacia, 5 gm.; distilled water, 25 gm.

The simple tincture of opium might advantageously be replaced by paregoric.

Phenacetine, according to Hinsberg (*Bollet. chim. farm.*, 1892, 72), when finely pulverized and heated to ebullition with nitric acid (1 : 10) shows an orange-yellow color, by which it may be recognized, since antipyrine and antifebrine, treated in the same manner give no reaction.—*Rev. inter. de Bibliog. méd.*, Dec., 1892, 398.

Butylhypnal.—Bernin has combined butylchloral with antipyrine which results in a compound analogous to hypnal or chloral antipy-

rine, and proposes the name butylhypnal. It forms light colorless crystals, having the odor of butylchloral, and a bitter taste, is fusible at 70° C., slightly soluble in water, and very soluble in alcohol, ether, benzin and chloroform. The solution is colored red by ferric chloride and yields an abundant crystalline precipitate on the addition of picric acid. It is decomposed by alkalies, and reduces potassium permanganate.—*Union pharm.*, Oct, 1892.

Cascarin and rhamnoxanthin.—According to M. Phipson, the yellow, crystalline substance obtained by Leprince from the bark of *Rhamnus Purshiana* (see January number, p. 16) is identical with that from Rhamnus Frangula. The two substances have the same chemical formula, the same molecular composition, and the same characters. Buchner extracted rhamnoxanthin from the latter tree as early as 1853.—*Rép. de Pharm.*, Oct., 1892; see also Amer. Jour. Pharm., 1886, p. 252.

Elixir of cascara sagrada.—Dujardin-Beaumetz (*Gaz. gynécologique*) recommends the following as a remedy for constipation: Fluid extract of cascara sagrada, 90 gm.; pure glycerin, 90 gm.; alcohol of 90 per cent., 200 gm.; simple syrup, 400 gm.; oil of orange 6 drops; oil of cinnamon, 2 drops, and sufficient distilled water for 1 litre. Dose—a wineglassful after meals.

Tonic syrup of kola.—If the elixir, or the wine of kola, is not well tolerated, especially by children, this excellent medicament may be administered in either of the following two ways:

(1) Ten to 50 drops of tincture of kola, in an infusion of black coffee, sweetened proportionately; or,

(2) An aromatic syrup prepared of tincture of kola, 20 gm.; tincture of vanilla, 20 drops; simple syrup, 90 gm., and sufficient distilled water for 160 gm. The dose is 15 to 30 gm. per day, according to age.

In order to avoid the insomnia, which follows the administration of the medicament in certain individuals, it should preferably be given after the mid-day meal.—*Rev. gén. de Clin. et de Thér.*, 1892.

Estimation of volatile oils in aromatic waters.—In an article on this subject published in the *Jour. de Pharm. d'Anvers*, Dec., 1892, Fernand Ranwez recommends the following process: In 200 ccm. of the aromatic water dissolve 60 gm. of table salt; add 40 ccm. of rectified ether; agitate well and decant the ether; repeat this treat-

ment with 40 ccm. and then with 20 ccm. of ether. Mix the ethereal solutions and then pour on calcium chloride, and filter the desiccated ether, to which the washings of the calcium chloride have been added, into an Erlenmayer flask, containing 5 ccm. olive oil, and previously weighed after drying at 100° C. Then distil the ether carefully, avoiding ebullition. When the ether has nearly all distilled over, place in a drying-oven at a temperature of 35° to 40°, and aid the evaporation by drawing a current of air through the flask for five minutes.

When the odor of the volatile oil has entirely displaced that of the ether in the residue, make several weighings, placing the flask into the drying oven for 3 or 4 minutes before each weighing, and displacing the vapors by drawing in air, until the weighings remain constant; subtract this weight from the weight of the flask containing the olive oil previously taken, and the remainder is the weight of volatile oil; this it is only necessary to multiply by 5 to have the proportion of the oil per litre of aromatic water.

The following table shows the author's results working by this process:

Plants employed for the distillation.	Belgian Pharmacopœia.			French Codex.		
	Gm. per litre.	Volatile oil contained in the litre.	Average.	Gm. per litre.	Volatile oil contained in the litre.	Average.
Ceylon Cinnamon, .	100	1·308; 1·381; 1·327	1·338	250	1·725; 1·724; 1·740	1·729
Anthemis, ...	200	0·42[illegible]; 0·438	0·433	250	0·543; 0·520	0·536
Rose, ...	400	0·1843; 0·1837; 0·1886	0·1885	1,000	0·480; 0·473; 0·418	0·457
Cherrylaurel, ...	—	1·325; 1·345; 1·290	1·32	—	—	—
Valerian, ...	100	0·135; 0·180; 0·162	0·159	250	0·208; 0·244; 0·172	0·208
Elder, ...	300	0·153; 0·165	0·159	250	0·181; 0·197; 0·204	0·194
Apium graveolens, .	100	0·255; 0·260	0·257	—	—	—
Orange Flowers, . .	350	0·426; 0·432	0·429	500	0·462; 0·487	0·474
Quadruple Orange Flower Water, . .	—	—	—	1,000	0·5605; 0·5975	0·579

Decoction of Cinchona.—The following is M. Lambotte's process:

Make a decoction of 1 kgm. of cinchona, filter at a temperature of at least 70° C., evaporate to 400 cc. on a water-bath, and add to the cooled liquid 100 cc. alcohol, which dissolves the precipitate formed during the evaporation; now make up the volume to 500 cc., by the addition of distilled water. This liquid represents double its weight of cinchona. To make a decoction of (say) 100 gm., 5 cc. of

this extract are added to 95 cc. *boiling* water, which keeps it in perfect solution, even after cooling, and has the same appearance as that made extemporaneously, while if the liquid is added to cold water, an abundant precipitate is produced.—*Jour. de Pharm. et de Chim.*, Nov., 1892.

Ammonium chloride in the treatment of cholera.—M. Dumontpallier, in the name of M. Marotte (*Rev. de Thér.*, Nov., 1892), mentions the following advantages of the use of this salt in the treatment of cholera: it produces a return of warmth and perspiration, also augments diuresis; one is justified in believing that it shows a way for the elimination of the toxic elements of this disease. The medicament should be prescribed in doses proportionate to the intensity of the disease, and the rapidity of the attacks in cachets or in liquid form. In addition to the medicament, a mustard bath is of advantage.

Preparation of gold bromide.—Ch. Patrouillard uses the following process:

Trichloride of gold, 1 gm.; potassium bromide, 1 gm.; diluted pure sulphuric acid (1 : 10), 4·50 gm., and distilled water, q. s. On warming, this mixture it shows a very dark rose color, due to the production of gold bromide. At a slightly elevated temperature, the reaction is complete in a few moments. Allow the solution to cool and agitate several times with about 10 ccm. of ether; when the aqueous solution will be nearly entirely decolorized.

Agitate the mixed ethereal solutions with a little pure basic calcium chloride; decant carefully and evaporate the ether. Dehydration is necessary in order to obtain the final product pure. If any water was still retained by the ether, desiccate at an elevated temperature, when a portion of the bromide is decomposed. By evaporating on a heated tile, the ethereal solution does not rise to the edge of the container, and the loss is avoided which is always experienced by heating on a water-bath.—*Soc. Pharm. de l'Eure*, 1892.

The crystalline substance present in cork.—According to M. Kügler (*L'Union pharm.*, Nov. 30, 1892, p. 524), the crystalline substance which Istrati (*L'Union*, p. 450) extracted from cork is identical with that extracted by him from the same substance in 1884 (see Amer. Jour. Phar., 1884, p. 240). Kügler reserved for this body the name *cerin*, previously proposed by Höhnel, he having micro-

graphically proven the presence of cerih crystals in cork cells. After a number of crystallizations this product has a fusing point, constant at 250°, and responds to the formula $C_{20}H_{32}O$.

Preparation of mercurial ointment.—M. Bernhard modifies Tardy's process (*L'Union pharm.*, March, 1891), as follows:

Take of mercury, 100 gm.; bezoinated lard, 90 gm., and lanolin, 10 gm. Triturate the mercury and the lanolin; add 10 drops of castor oil, triturating again for a few moments; then incorporate 20 gm. of the benzoinated lard, triturating energetically until the mercury globules have completely disappeared, which will take about five minutes, when the rest of the benzoinated lard is added. Operated in this way, the preparation is completed in fifteen minutes, and responds to all the requirements of the Codex.—*Soc. de Pharm. de l' Eure;* see also Amer. Jour. Pharm., 1889, p. 247, and 1891, p. 124.

Paste for fixing labels on glass, porcelain and iron.—The following is recommended in *Nouveaux Remèdes*, November, 1892, p. 1: 120 gm. of gum arabic and 30 gm. of gum tragacanth are macerated separately in a little water; the latter mixture is agitated until a viscous emulsion is formed, when the gum arabic solution is added and the whole filtered through fine linen. With this liquid are then incorporated 120 gm. of glycerin, in which 2·5 gm. oil of thyme have been dissolved. The volume is then made up to one litre by the addition of distilled water. This paste is said to possess remarkable adhesiveness, and to keep well in sealed flasks.

ALKALOIDAL ASSAYING.

By C. C. Keller.

Abstract from Schweiz. Wochensch: f. Chem. und Phar., 1892, pp. 501 and 509, by F. X. Moerk.

The Swiss Pharmacopœia, now undergoing revision, will show a marked progress in the matter of assayed drugs and preparations, since it is the intention to give for numerous preparations accurate or at least approximate quantitative methods of examination. Of the several general assay methods, (I) Dieterich's method (mixing the drug with calcium hydrate, drying, powdering, extracting with ether, evaporating, dissolving the residue in alcohol and titrating with $\frac{1}{100}$ *n*-hydrochloric acid, using logwood as the indicator) is opposed for several reasons: (1) The use of a fragile extracting

apparatus; (2) the difficulty in obtaining complete extraction; (3) a number of the alkaloids are easily decomposed by the calcium hydrate, especially brucine, hyoscyamine, atropine, etc.; (4) The very great difficulty in preventing the ether from carrying particles of the calcium hydrate into the ethereal solution; some of these difficulties cause a loss of alkaloids, the last-mentioned an increase in the yield of alkaloid. Dr. A. Partheil's modification of this method (Am. Journ. Pharm., 1892, 521) is rather a complication of the method without correcting any of its fallacies. (II) Beckurts' and Holst's method (a modification of Dragendorff's method in which the objectionable emulsifying is prevented by extracting dilute alcoholic extract solution with three portions of chloroform of 20, 10 and 10 cc., respectively, distilling off the chloroform from the mixed chloroform solutions, dissolving the residue in warm $\frac{1}{10}$ *n*-hydrochloric acid, filtering, washing the filter with water and titrating the solution with $\frac{1}{100}$ *n*-alkali, using cochineal as indicator) which generally gives agreeing results, possesses also some disadvantages. (1) Although the addition of alcohol at first prevents the emulsifying, the solubility of alcohol in chloroform and hence its removal causes, especially in the third extraction, considerable trouble in separating the chloroform; (2) owing to the presence of the alcohol the alkaloid obtained is rather impure and colored; (3) numerous experiments show that the three portions of chloroform will not completely remove the alkaloid; to effect this the liquid must be extracted with chloroform until no precipitation occurs upon acidifying and adding Mayer's reagent; (4) it requires too much time. (III) Schweissinger and Sarnow's method (Am. Journ. Pharm., 1891, 96) (in which a concentrated aqueous solution of the extract made alkaline with ammonia is agitated with a relatively large quantity of a mixture of chloroform and ether and then a portion only of the alkaloidal solution evaporated and weighed or titrated with $\frac{1}{100}$ *n*-acid using cochineal as indicator; the solvent can be a mixture of chloroform and ether, which may be lighter or heavier than water as may seem desirable) after numerous series of experiments is hailed as the method containing the basis upon which future Pharmacopœias will form their alkaloidal assays; as advantages are stated: (1) That no special apparatus is required; (2) by the use of the mixed solvent no emulsion is formed; (3) the rapidity of its execution; (4) with proper modification it is suitable

not only for preparations but also for crude drugs; (5) the comparative purity of the alkaloids; and (6) closely agreeing results.

In referring to its general use the following statements are interesting: In assaying extracts the *quantity should not be too small*, of fluid extracts the use of 6 to 10 grams overcomes the difficulty of weighing or titrating minute quantities of alkaloid and has the advantage of allowing the use of $\frac{1}{10}$ or $\frac{1}{20}$ *n*-acid in titrating whereby the process is made easier. The extract must not be too concentrated, or fallacious and varying results will be obtained, whereas proper dilution insures at once correct and agreeing results. For extractions the lighter chloroform-ether mixture is preferable because allowing the use of ordinary dispensing vials and not necessitating the use of a separating funnel; mixtures containing little chloroform, in some cases even pure ether, are recommended because of the greater purity of the alkaloid; chloroform or mixtures containing a larger quantity of chloroform tend to extract an impurer alkaloid. The extract solution should be agitated with the alkaloidal solvent before the addition of the alkali (almost exclusively water of ammonia), as this procedure favors the solution of the alkaloid when liberated. In the majority of assays the ether-chloroform solution can be poured off clear, in exceptional cases the solvent must be passed through a dry filter, preventing loss by evaporation by covering the funnel. By placing the alkaloid solution in a weighed Erlenmeyer flask the solvent can be distilled off and the residue weighed and then titrated; this combination of weighing the residue and titrating it, will serve to a certain extent as a check and detect the addition of cheaper alkaloids to inferior preparations of the more expensive drugs; as an illustration is cited the addition of cinchonine to raise the alkaloidal value of an inferior fluid extract of ipecac. Attention is called to the fact that the weight of the residue always indicates a higher result than by titration; recently Professor Norton and H. T. Nichols (Am. Journ. Pharm., 1892, 340) have proven that even by using pure alkaloids in chloroform solution an increase in weight results, and state that "the increase in weight is of importance, has as yet not been explained and that to determine the cause further investigations will be made." The explanation is very simple: The alkaloid retains some chloroform which a temperature of 90° or even 100° C. will not, or only very slowly, dissipate; this behavior is due to

the high specific gravity of the chloroform allowing a film or layer of amorphous alkaloid to form on the surface, which then prevents the escape of the remainder of the chloroform; the last portions of the chloroform can be gotten rid of by dissolving the residue in 5 or 10 cc. ether and evaporating the ether at the temperature of the water-bath; by repeating the operation only traces of the chloroform will remain, and drying at 90–100° C. is facilitated by the amorphous alkaloid becoming crystalline. The titration of the alkaloidal residue is effected readily by dissolving in alcohol, adding water until a faint turbidity results and titrating with the acid; hæmatoxylin (1 per cent.) in alcoholic solution gives after a little practice the best results as an indicator, care being taken to add only one or two drops of the solution, otherwise difficulty is encountered in determining the end reaction.

Assay of the fluid extract of ipecac.—8 grams of the fluid extract are diluted with 8 grams water in an ordinary vial, 32 grams chloroform and 48 grams ether added and thoroughly agitated; 4 grams water of ammonia are next added and the mixture frequently agitated during half an hour. After separation 50 grams of the chloroform-ether solution representing 5 grams of the extract are poured or filtered into a tared flask and the solvent distilled off; the varnish-like residue is twice treated with 5–10 cc. ether and evaporated by forcing a current of air into the flask by means of a rubber bulb; after the last traces of ether have been removed and the residue dried in a water-bath it is weighed. For the titration the alkaloid is dissolved with the aid of heat in 10 cc. absolute alcohol and sufficient water added to give a permanent turbidity; after adding one or two drops hæmatoxylin solution $\frac{1}{10}$ *n*-hydrochloric acid is added until the violet-red color changes to a pure pale-yellow. Emetine, according to Kunz, is di-acid and has the formula $C_{30}H_{40}N_2O_5$, mol. weight 508 (by a control experiment with pure emetine this formula was found to be correct; the older formula $C_{20}H_{30}N_2O_5$, however, is still to be found in some recent standard works), the equivalent weight, therefore, is 254 and 1 cc. $\frac{1}{10}$ *n*-hydrochloric acid represents 0·0254 grams emetine. In various samples of fluid extract of ipecac made from the same drug by different methods 2·54–2·59 per cent. emetine was found.

The statement, recently published by Cæsar & Loretz (Am. Jour. Pharm. 1892, 568), that the best selected ipecac root yielded at the

most 1·85 per cent. emetine, caused the investigation to include the assay of the crude drug. The process used in the just-quoted analysis was proposed by Kremel (Am. Jour. Pharm., 1892, 519); in it the finely powdered drug is mixed with calcium hydrate and water and dried in a steam-bath before extracting with chloroform; after 6 hours' extraction 0·82 per cent. emetine, after 4 hours' further extraction 0·12 per cent. additional was obtained, or by 10 hours' extraction 0·94 per cent. emetine; various modifications of the method did not give more favorable results. The reason for the small yield of alkaloid is no doubt due to the gelatinizing of the starch and in the subsequent drying this covers the cellular tissue so that the cell contents cannot be acted upon by solvents. As a result of the experiments to devise a practical and reliable method for the

Assay of ipecac root, the following is offered: 10 grams of the finely powdered and dried (at 100° C.) root is placed in a dry bottle of 150 cc. capacity, 40 grams chloroform and 60 grams ether added and thoroughly mixed by agitation for several minutes; by the addition of 10 grams water of ammonia the suspended powder separates almost immediately while the emetine is dissolved; frequent agitation during one hour is followed by a further addition of 5 grams water of ammonia which upon agitation causes the powder to agglutinate into a lump, while the liquid becomes perfectly clear and if necessary could be almost completely poured off. Fifty grams of the alkaloidal solution, representing 5 grams of the dried root, is then transferred to a weighed Erlenmeyer flask and the process completed as described under the assay of the fluid extract. The titration in this case is a little more difficult because of the extraction of a little fat from the root (the average of six determinations of fat in ipecac gives 0·31 per cent.); an improvement of the assay process consists in extracting the fat from the dried powdered root before submitting it to the assay. For this purpose 10 grams of the powder are placed in a small glass funnel closed with a plug of cotton and percolated with ether until the latter runs through colorless, usually 15–20 cc. suffice; then with a glass rod the cotton and powder are pushed through the funnel into a dry, weighed bottle of 150 cc. capacity and washed with ether until the weight of the ether in the bottle equals 60 grams, then add 40 grams chloroform, etc., as before. By this preliminary treatment the alkaloid solution remains almost perfectly clear

during the titration. Assays made with six samples of ipecac root (No. 5, the root used in making the fluid extracts; No. 6, a selected Carthagena-ipecac from Cæsar and Loretz) gave the following results:

	1	2	3	4	5	6
	Per Cent.					
Emetine by weighing the residue, . .	3·032	3·078	3·148	3·028	2·620	2·700
Emetine by titrating the residue, . .	2·794	2·743	2·844	2·743	2·565	2·438
Difference between the two, ...	0·238	0·335	0·304	0·285	0·055	0·262

From these results a pharmacopœial requirement of 2·5 per cent. emetine in the ipecac root would not be too exacting. As the objection that the assay determines not only emetine but cholin may be raised against this method, the alkaloidal residue from 50 grams of the root was dissolved in dilute alcohol, neutralized with hydrochloric acid, evaporated to dryness and dissolved in a little water; this solution, which should contain the cholin as hydrochloric, was distilled with baryta water, but the distillate was found to be entirely free from cholin.

CAFFEINE AND THEINE: THEIR IDENTITY AND THE REACTIONS OF CAFFEINE WITH AURIC CHLORIDE.[1]

By Wyndham R. Dunstan and W. F. J. Shepheard.

From the Research Laboratory of the Pharmaceutical Society.

In consequence of the conclusions of Mayo (*Journ. Physiol.*, 7, 458; *Therapeutic Gazette*, 1866, 587) and, more recently, of Lauder Brunton and Cash (*Proc. Roy. Soc.*, 42, 283; *Journ. Physiol.*, 9, 112), that the physiological action of theine obtained from tea differs in certain respects from that of caffeine obtained from coffee, the authors have searched for evidence of isomerism in these bases, the existence of which is not put beyond doubt by the chemical comparison of them which has hitherto been made.

Having extracted theine from tea and caffeine from coffee it is shown that the two substances exactly resemble each other and melt at precisely the same temperature, viz., 234·5° (corr.). From each base the crystalline *aurochloride* ($C_8H_{10}N_4O_2$,HCl, Au Cl_3,$2H_2O$) was prepared, and these two salts both melted at 242·5° (corr.). When dried at 100° they both lost the equivalent of two

[1] The substance of a communication made to the Chemical Society on December 15; reprinted from *Phar. Jour. and Trans.*, Dec. 17, 1892, p. 481.

molecular proportions of water, and the anhydrous salts melted at the same temperature, viz., 248·5° (corr.). The analytical data corresponded with the formulæ given above. The complete correspondence in the properties and composition of the aurochlorides is satisfactory evidence of the absence of a structural difference in the bases. In order to further confirm the identity of the two substances, a specimen of each was converted into the *mercuric chloride compound* ($C_8H_{10}N_4O_2,HgCl_2$), a stable crystalline salt. Both preparations were found to melt at the same temperature, viz., 246° (corr.), and to exactly correspond with each other in other respects.

The complete identity of caffeine and theine having thus been demonstrated, the observed differences in their physiological action must be ascribed either to impurities in the specimens used, or to variations in the animals employed in the experiments. The circumstance that theine was found to be more active than caffeine, and to be capable of producing effects not produced by caffeine, tends to support the view that the theine was impure. It is now well known that tea contains other bases than caffeine, the presence of traces of which might be sufficient to account for the observed differences.

During the preparation of the pure aurochlorides for a comparison of their properties, the authors obtained two new and interesting auric derivatives of caffeine.

When an aqueous solution of caffeine aurochloride is heated, a yellow, flocculent precipitate is gradually formed, which is insoluble in alcohol, chloroform, and ether, but dissolves in hydrochloric acid, reproducing the aurochloride. The substance dried at 100° forms a pale yellow, amorphous powder, which melts at 207° (corr.). Analysis proved it to be *aurochlor caffeine* $C_8H_9(AuCl_2)N_4O_2$, a substance in which one atom of hydrogen in caffeine is replaced by the group ($AuCl_2$). It is pointed out that the ready formation of this remarkable compound from caffeine aurochloride by the loss of two molecular proportions of hydrochloric acid—$C_8H_{10}N_4O_2,HCl,AuCl_3 = 2\,HCl + C_8H_9(AuCl_2)N_4O_2$—is better shown by Medicus' formula for caffeine than by that proposed by Emil Fischer; since in Medicus' formula the CH group which loses hydrogen is represented as contiguous to the doubly linked nitrogen atom, to which the auric chloride is attached.

By the reaction of an alcoholic solution of potassium chloraurate

($KCl,AuCl_3$) with a solution of caffeine in chloroform, a salt, crystallizing in dark red needles, was obtained. This is shown to be *caffeine potassium aurochloride* ($C_8H_{10}N_4O_2$, KCl, $AuCl_3$), which differs from caffeine aurochloride in containing potassium in the place of the hydrogen of hydrochloric acid. This salt melts at 208° (corr.). It readily dissolves in alcohol and water, forming yellow solutions, which appear to contain not the salt itself, but its constituents—caffeine and potassium chloraurate. The salt is nearly insoluble in ether and chloroform, but prolonged contact with these liquids leads to its decomposition into caffeine and potassium chloraurate.

Both aurochlor caffeine and the caffeine potassium aurochloride were obtained alike from the bases derived from tea and coffee.

DETECTION OF ATROPINE.[1]

By L. Fabris.

A patient at a hospital in Padua, who had for some time been treated by daily injections of 6 milligrams of strychnine nitrate, died a few hours after receiving an accidental injection of 3 milligrams of normal atropine sulphate, exhibiting acute symptoms of atropine poisoning. At the *post-mortem*, the presence of bilateral mydriasis, and of congestion of the meninges and of the cerebellum became evident. On examining the viscera by the Stas-Otto method, clear indications of the presence of an alkaloid were obtained, but on applying the special reactions for strychnine and atropine, the results were negative. To test the possibility of these alkaloids obscuring each other's reactions, mixtures of 3 per cent. solutions (the strength of the injections) of strychnine nitrate, and atropine sulphate were tested with sulphuric acid and potassium dichromate, and by Vitali's reaction, with the following results. A mixture of equal parts of the solutions gave the strychnine reaction very clearly, but the atropine reaction not at all; a mixture of 1 of strychnine with 3 of atropine gave the strychnine reaction, but not that of atropine; a mixture of 1 part of strychnine with 4 of atropine gave indistinct reactions for both alkaloids; a mixture of 1 of strychnine to 5 of atropine gave a momentary atropine reaction; the characteristic violet coloration is, however, immediately superseded

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[1] *Gazzetta*, **22**, i, 347–350. *Jour. Chem. Soc.*, 1892, p. 1534.

by a reddish tint. Vitali's reaction was not clearly obtained until at least 9 parts of the atropine solution were added to 1 of strychnine. It further appeared that a solution of strychnine too dilute to give the characteristic reactions of that alkaloid may effectually obscure the atropine reaction; thus 1 drop of the 3 per cent. strychnine solution diluted with 10 drops of water scarcely yields the strychnine reaction; on adding 4 drops of atropine solution to this, no reaction for atropine could be obtained.

A piece of meat injected with 0·05 cc. of a 3 per cent. solution of each of the alkaloids, and extracted by the Stas-Otto process, yielded a barely sensible strychnine reaction and no trace of atropine. Finally, on injecting a mixture of 3 parts of the 3 per cent. strychnine solution and 1 part of the atropine solution into a frog, paralysis of the lower limbs and a great augmentation of the nervous sensibility ensued; on introducing the mixture into the eye of a dog, distinct mydriasis was observed in fifteen minutes. It thus appears that in cases of poisoning by atropine, the physiological evidence may be conclusive when the chemical tests yield doubtful results.

ON THE ACTION OF THE VOLATILE OIL OF ATHEROSPERMA MOSCHATA.[1]

By Ralph Stockman, M.D., F.R.C.P.E.

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The *Atherosperma moschata*, or Australian sassafras, is a tree growing in S. Australia and Tasmania, and belonging to the natural order Monimiaceæ, tribe Atherospermeæ. The literature regarding its economic and medicinal uses is by no means large. The bark has been used as a substitute for tea,[2] while a decoction and a tincture have been employed therapeutically.

In 1861, Zeyer[3] obtained from the bark an alkaloid, which he named atherospermine, but regarding the physiological action of which nothing is known. In 1862, Greeves, in a letter to the editor of the *Lancet*, states that the bark has long been used by the

[1] Read at an evening meeting of the Pharmaceutical Society in Edinburgh; from *Phar. Jour. and Trans.*, Decb. 24, 1892, p. 512.

[2] *Pharm. Jour.* [1], vol. xv, p. 115; *Amer. Jour. Phar.*, 1856, p. 73.

[3] *Vierteljahrschr. f. pract. Pharm*, x, p. 504; *Amer. Jour. Phar.*, 1862, p. 166.

early settlers and Bushmen in the form of a diet drink in rheumatism and secondary syphilis.[1] He adds that he himself and other practitioners have used it with most excellent results in acute bronchitis as a decoction (1 oz. bark to 1 pint water, boiled 10–15 minutes, dose 1–2 oz. three or four times daily), and that it acts freely on the kidneys and skin, and facilitates expectoration, while reducing the secretion of bronchial mucus. Further, that Bosisto has obtained an essential oil from the bark, and that this has been given by Dr. Hudson with marked success in heart disease. He adds that the volatile oil must be used with great caution, as a single drop is a full dose, and quotes as his authority the *Australian Medical Journal*, of October, 1861.[2] I have not been able to consult the reference, but Bosisto repeats the statement (*Phar. Journ.*, [3], vol. xvii, p. 417).

If the volatile oil is so active in such small dose, it must differ remarkably from other volatile oils. As I was anxious to ascertain whether this is so, I applied to Mr. E. M. Holmes and Mr. Bosisto, and readily obtained from these gentlemen a sufficient supply of the bark and its volatile oil to enable me to carry out an investigation into their physiological action.

The oil is light yellow in color, with a pleasant aromatic, slightly pungent smell and taste, not unlike oil of sassafras. On exposure to the air it tends to become thick and resinous, and its solubilities in various menstrua are similar to those of other volatile oils.

The physiological experiments which I have made with it have convinced me that it also does not differ from other volatile oils in its general action, and that there is no reason for attributing to it any specially poisonous effects.

Thus, when a frog is placed under a glass jar on the sides of which a few drops of the oil have been smeared, it at first shows signs of restlessness, but in a few minutes there ensue symptoms of marked depression of the central nervous system. It first becomes clumsy in its movements, jumps with great difficulty, and then lies quite motionless and flaccid as if dead. Respiration soon ceases, the motor nerves become paralyzed in time, but the heart goes on beating for two or three hours, finally stopping in diastole. After

[1] *Lancet*, i, 134, 1862.

[2] This statement was also made by A. Redford, in *Proc. Liverpool Chemists Assoc.*, republished in *Amer. Jour. Phar.*, 1863, p. 452.

death the muscles are quite excitable to electricity. Administration of small doses by the mouth or by subcutaneous injection gave exactly similar results. Two minims of the oil given subcutaneously is an overwhelming dose for a frog, and kills it almost at once by paralyzing the heart.

In rabbits small doses have no apparent action, but one drachm given by the mouth causes a good deal of stupor, lasting for an hour or two. The heart was not affected, but the respiration was slowed to about one-half of its original rate. Three drachms by the mouth caused death in twelve hours in complete coma, both heart and respiration being gradually and markedly depressed, especially the latter. In mammals, therefore, as in frogs, the central nervous system (spinal cord and brain) is chiefly affected.

Excretion of the oil, but considerably altered just as other essential oils are, takes place in the urine.

I have taken repeatedly doses up to 10 minims, but was unable to observe that either its local or general action differed in any way from similar volatile oils, such as oil of sassafras or of eucalyptus.

It is antiseptic, and in watery solution preserves albuminous solutions for an indefinite time.

As it was just possible that other constituents of the bark might be poisonous and impart their activity to some specimens of the oil, I made an alcoholic extract from 15 grammes of the bark and gave the whole to a rabbit without any apparent effect. Further, I thoroughly extracted 100 grammes of the powdered bark with amylic alcohol to which a few drops of ammonia had been added. The amylic alcohol was then shaken up with hydrochloric acid water, the acid solution drawn off and excess of ammonia added to it, when a dense white flocculent precipitate formed. This I took to be Zeyer's atherospermine. One-half of it was given to a rabbit, but it had not any visible action.

It seems therefore certain, that neither the volatile oil nor any other constituent of the bark of *Atherosperma moschata* is particularly active or poisonous, and further that the volatile oil has a close resemblance in physiological action to other volatile oils. Regarding its uses as a diaphoretic, expectorant and alterative, there is little doubt that it is simply similar to the many other essential oils or plants containing them which are used in medicine for similar purposes.

NOTES ON THE EUCALYPTUS.[1]

By W. C. Tyndale, of Chicago, Ill.

The Eucalyptus tree is a native of Australia and Tasmania, where it forms large forests. There are about 140 species described, but they vary extremely, different kinds of leaves being produced on the same tree, thus presenting distinct specific characters, and varying also in the nature of their barks.

In Tasmania and Gippsland Victoria, they grow to an immense height, often exceeding 400 feet. Their naked and branchless stems of a dirty white color look like natural columns. These are often blackened by the fires of the natives or wrung by the settler's axe, when they afford a grand but dismal spectacle, as one speeds along in the train; in some districts square miles of country are passed in which the forests have been wrung preparatory to settlement, and in some cases for no obvious reason, as the land is unfit for occupation and there stand those former monarchs of the forest like giant skeletons, sapless, lifeless looking, dismal, and forlorn in the midst oftentimes, of a luxuriant undergrowth.

The trees are named usually according to the nature of their bark which they shed instead of their leaves, such as stringy bark (*E. obliqua*), iron bark (*E. Sideroxylon*), blue gum (*E. Globulus*), peppermint tree (*E. amygdalina*).

The wood of some is very hard and durable, and so heavy as to sink in water. Many yield a kind of resin or gum, such as *E. resinifera* and *E. amygdalina*. A volatile oil of wonderful medicinal qualities is also produced from the leaves of various kinds but more especially from that known as the *E. amygdalina*, which is the most productive, and yields nine-tenths of the oil of commerce, though not always placed in the market under its own name.

This arises from a certain amount of notoriety gained for the *E. Globulus* abroad, owing to the fact that it is the easiest of the species to acclimatize. As a matter of fact, however, there is scarcely any E. Globulus distilled in Australia. *E. mannifera* yields sweet secretions analogous to manna. *E. Gunnii* furnishes a liquid that ferments and forms a kind of beer. They all produce abundance of seed, which vegetates freely and becomes naturalized in various countries.

[1] *Journal of the Amer. Med. Assoc.*, Jan. 21, 1893, p. 70; compare also *Amer. Jour. Phar.*, 1876, pp. 370–375.

The *E. amygdalina* or giant eucalyptus, called "Waugara," by the natives, is also known as the peppermint tree. This is one of the most remarkable and important of all the plants in the whole creation. Viewed in its marvellous height when standing forth in its fullest development on the slopes or within the glens of mountain forests, it represents probably the tallest of all the trees of the globe. Regarded as a hard wood tree of rapid growth it ranks foremost, and contemplated in respect to its yield of volatile oil from its copious foliage it is unsurpassed and perhaps unequalled by any tree in the world. These qualities have made it become generally known and much through the exertions of Baron Von Mueller, this tree is now being introduced abroad with good results in countries neither subject to severe frosts or intense moist heat. It assumes under different climatic and geologic conditions, various forms. Thus, in the ravines of the cooler ranges it attains its greater height, combined with a perfect straightness of stem, while the bark strips so completely as to render the huge stem quite smooth and almost white.

In the more open country it is much smaller. Under these conditions it is called a "peppermint tree" in Victoria and Tasmania, and a "messmate tree" in New South Wales.

In Victoria this tree often exceeds 400 feet in height. Such trees are found on the Black Spur, Upper Yarra Yarra, and Upper Goulbourn. A fallen tree on the Dandenong Ranges measured 420 feet. The length of the stem up to the first branch was 295 feet. The diameter of the stem where it was broken 365 feet from the root was three feet.

A still thicker tree in the same locality measured 53 feet in circumference three feet from the ground.

A tree near Mount Wellington, Tasmania, has been found which measured 12 feet in diameter 220 feet from the ground. Another tree was found 130 feet in circumference at the base. Within a square mile 100 trees could be counted with a circumference of at least 40 feet. At the foot of Mount Baw Baw, Victoria, is found the highest of the giant trees of Australia. This monster is 471 feet high, and another on the Cape Otway ranges is 415 feet in height. The final height is sometimes attained by a single branch pushing skyward.

It is a grand picture to see a mass of enormous tall trees of this

kind with stems of mast-like straightness and clear whiteness so close together in the forest as to allow them space only towards the summit to send their scanty branches and sparse foliage to the free light.

The distillation of the oil was first initiated by Baron Von Mueller. *E. amygdalina* yields more oil than any of the other varieties, and is therefore almost solely employed for the purposes of distillation. It is also one of the best for subduing malarious effluvia in fever regions, although it does not grow abroad quite so well or quickly as E. Globulus

The respective hygienic value of various trees may to some extent be judged by the percentage of oil in their leaves, as stated below.

	Per Cent. of Oil.
E. Amygdalina	3·313
E. Oleosa	1·250
E. Leucoxylon	1·060
E. Goniocalyx	·914
E. Globulus	·719

The lesser quantity of oil in E. Globulus is compensated for by vigor of its growth, and early copiousness of its foliage. It readily adapts itself to other climates and hence abroad nearly all varieties of the oil are known as Globulus. During the last twenty years the blue gum has come into high repute as a sanitary tree A high authority states that the sewage system of large towns in warm climes would be simplified if each house had the ever green gum tree in the back yard. The disinfecting and deodorizing virtues of the tree are unquestionable.

Flesh of any kind is as well preserved by eucalyptus as by creasote, while beef sprinkled with it will dry hard without putrefaction. It is fatal to bacteria and other microörganisms. It may be injected into the veins and arteries of cadavers for purposes of preservation. It is also a good admixture in dressing gangrene.

PERFUME IN FLOWERS.[1]

Researches upon the Mode of its Production.

By E. Mesnard.

The insufficient nature of the micro-chemical methods usually employed has so far prevented an exact knowledge being obtained

[1] Adapted from *Comptes rendus de l'Académie des Sciences;* reprinted from *Phar. Jour. and Trans.*, Jan. 7, 1893, p. 549.

of the matter in which the perfume of flowers is produced. I have applied to this class of researches a general method which has served in the localization of fixed oils. The section being placed in a drop of pure glycerin is arranged upon a round cover glass, which, being then inverted, serves as a cover to a small chamber formed by cementing a glass ring to an object slide. In the interior of the chamber is fixed another ring of smaller diameter and somewhat less in height, thus forming with the first an annular space in which the reagent may be placed. By adopting this arrangement the light passing through the central part of the cell is not modified. The inner ring will further serve to support a very small cover glass, upon which sections may be arranged which require to be exposed to the action of the reagent for some length of time, as occasionally happens in the case of the fixed oils. The reagent invariably employed is pure hydrochloric acid, the hydrated vapors from which are readily absorbed by the glycerin. In this way, by a gentle and easily regulated action, I obtain complete hydration of sections in the presence of an acid. When they have been exposed for a short time, the essential oils appear as minute spherical drops of a fine transparent golden yellow. If the action be prolonged the drops disappear, being transformed into diffusible products. The tendency of the globules is not seen in the fixed oils, so that it provides a means of distinguishing these two classes of products.

Jasmin.—In this flower the essence is situated in the row of epidermal cells on the upper side of the petals and sepals. Some exist also in the corresponding layer on the under surface, where the sepals are colored by a violet pigment. If the evolution of the cell contents in flowers at different stages of development be followed, at first nothing but chlorophyll is found in the tissue; tannin appears next, or rather intermediate glucosides, difficult to identify by means of the ordinary tests for these substances. These glucosides furnish the tannin and pigments of the lower surface of the sepals. The hydrochloric acid vapors distinguish all the tannoid compounds intermediate between the chlorophyll and tannin or pigments on the one hand, and between the chlorophyll and essential oil on the other. The explanation of these facts seem to be as follows: Whereas upon the lower surface of the bud, which was exposed to the action of light and the oxygen of the air, the tannoid compounds were slowly oxidized and gave rise to tannin, upon

the upper surface which was hidden in the bud these agencies were inoperative, and the same compounds were converted into essential oil, which oxidizes in contact with the air and produces the sensation of perfume.

Roses.—The essence in roses is found in the papilliform epidermal cells[1] on the upper surface of the petals, scarcely ever on the lower side. The origin of the essence is easily recognized as being the same as in the preceding case. The delicacy and the special odor of the essence furnished by each variety of roses seems to depend upon the more or less complete transformation of the intermediate tannoid compounds derived from the chlorophyll.

Violets.—The essence is here similarly situated. It is necessary, however, before applying reagents to the sections in this instance to immerse them in tungstate of sodium solution for some minutes, in order to precipitate the tannin. The essential oil then appears bright red.

Tuberose.—In this case, the essential oil is found upon the lower surface of different parts of the perianth. The intermediate cells contain a fixed oil. Tannin is scarcely perceptible. Here, then, in consequence of the abundance of chlorophyll in the first place, of the almost complete absence of tannin, and also, probably, of the presence of fixed oil which has swept it towards the periphery, the essential oil is carried towards the lower surface. The intense odor of the tuberose only commences to reveal itself when the oil is enabled to form itself into small drops under the influence of the reagent.

Orange.—The reagent discloses the presence of several distinct essences in orange blossoms. First there is that of the secretory sacs, which occur on the lower surface of the petals or sepals. This is not essence of neroli, as is generally supposed, but an essence analogous to that of petit-grain. By skilfully eliminating these sacs in an unopened bud, the agreeable odor of the flower when it afterwards expands is in no degree injured. Essential oil is still found in the epidermis on both surfaces of the petals, and likewise upon the periphery of the petaloid filaments of the stamens. By systematically preventing, in various ways, the liberation of the

[1] Blondel, "Produits odorants des Rosiers" ("Thèse de la Faculté de Méd.," 1889.)

perfume in these different regions, I have been able to assure myself that the odor from the upper surface of the petals alone corresponds to the finest neroli. The odor of the flower then is a mixture.

The conclusions to be drawn from these researches are:

(1) That the essential oil is generally found localized in the epidermal cells of the upper surface of the petals or sepals, though it may exist upon both surfaces, especially if the floral organs are completely hidden in the bud. The lower surface generally contains tannin or pigments derived from it.

(2) The chlorophyll seems, in every case, to give rise to the essential oil. This transformation is readily comprehended if it be admitted, as is generally understood, that the floral organs are but modified leaves found performing a new function. The chlorophyll being thus diverted from its original purpose, may be transformed into tannoid compounds or into essential oils.

(3) The liberation of perfume in the flower only becomes perceptible when the essential oil is sufficiently freed from the intermediate compounds which have given rise to it. Its formation is to some extent in inverse proportion to that of the tannin and pigments in the flower. This will explain why flowers with green petals possess no odor, why white flowers or roses are most frequently odoriferous, why the *Compositæ* which are so rich in tannin[1] have a characteristic disagreeable odor, and why the cultivated white lilac and forced roses acquire a very fine perfume.

THE ACTION OF NITRIC ACID ON METALS.[2]

By C. Montemartini.

Much contradiction exists as to the changes which occur when nitric acid acts on *tin*. The author finds that the acid, up to a concentration of 12 per cent., always attacks tin with formation of stannous salt, which partially decomposes, forming a turbid solution; gas is always evolved, although slowly. Nitric acid from 12 to 45 per cent. completely dissolves the metal to a yellow solution, with an abundant evolution of gas; the solution, when left, slowly becomes turbid, but the precipitation may be retarded by

[1] Daniel, "Le Tannin des Composées" (*Rev. Gén. de Bot.*, ii. 391).

[2] *Gazzetta*, **22**, 384, 397 and 426; *Jour. Chem. Soc.*, 1892, p. 1402; compare also Amer. Jour. Phar., Dec., 1892, p. 618.

adding hydrochloric acid. The tin is present in these solutions as stannous nitrate, and the turbidity is due partly to the oxidation of this salt and partly to its conversion into insoluble stannous compounds, which, in turn, yield stannic hydrate. Nitric acid of more than 45 per cent. concentration does not dissolve tin, but converts it into a white substance. If 70 per cent. acid is used, this white oxidation product is soluble in water, but the solution, after a few seconds becomes turbid, and stannic hydrate is deposited; the addition of hydrochloric acid to the clear solution greatly retards the precipitation. The soluble, white substance is found by analysis to be stannic nitrate, $Sn(NO_3)_4$; it is stable in presence of concentrated nitric acid at 90°, but is immediately decomposed at 100°.

The solution of 1 gram of tin in excess of 27·5 per cent. acid yields 0·0180 gram of ammonia, 0·1060 gram of nitrous oxide, and 0·0051 gram of nitrogen. The maximum quantity of ammonia is obtained when 1 per cent. nitric acid is used, but the rate of diminution in the amount of this gas produced, as stronger acid is used, is small; even 70 per cent. acid causes the formation of much ammonia. The hypothesis that the nitric acid is reduced by nascent hydrogen is insufficient for the explanation of the phenomena observed during the action of nitric acid on tin.

Contrary to the statements of Personne (*Bull. Soc. Chim.*, 1864, i, 163) and Maumené (*Ann. Chim. Phys.* [4], **3**, 343), the action on *antimony* of nitric acid, varying in concentration from 2 to 70·27 per cent., does not yield appreciable quantities of ammonia; 2 per cent. acid has very little action on the metal. Antimony is not dissolved by nitric acid; a white powder always remains; when 70 per cent. acid is used, this residue seems to have the composition $(SbO)NO_3$. Nitric peroxide is practically the sole gas produced when this metal is used.

Molybdenum is attacked by 3 to 70 per cent. acid without the formation of ammonia. Concentrated acid (70 per cent.) attacks the metal but slowly; a much more vigorous action occurs with weaker acid (50 per cent.) and a reddish solution and residue are obtained. The solution reduces permanganate, so that the metal is not immediately converted into molybdic anhydride by 50 per cent. acid, but a nitrate would seem to be first formed; 70 per cent. acid at once gives molybdic anhydride. The quantity of nitric oxide produced in the reaction between nitric acid and molybdenum decreases as

the concentration of the acid increases; nitric peroxide is the main gaseous product with 50 per cent. acid. Neither nitrogen nor nitrous oxide is formed.

No appreciable amount of ammonia is produced in the reaction between *copper* and 3 or 27·5 per cent nitric acid. Dilute acid (below 30 per cent.) yields only nitric oxide and nitrous acid; with stronger acid, the gas evolved is principally nitrogen tetroxide, but small quantities of the trioxide are also formed. With acid of less than 30 per cent. concentration, the reaction is represented by the equation $Cu + 3HNO_3 = Cu(NO_3)_2 + HNO_2 + H_2O$. Nitric oxide is then formed in accordance with the equation $3HNO_2 = 2NO + HNO_3 + H_2O$. Nitric peroxide only is obtained with 70 per cent. acid.

Below 15°, nitric acid of all concentrations attacks pure *lead* very slowly; rather dilute acid acts the most rapidly. Small quantities of ammonia are formed, the amount being greatest with weak acid.

The action of nitric acid (27·5 and 70 per cent.) on *bismuth* yields neither ammonia, nitrogen, nor nitrous oxide. More nitric oxide is obtained with dilute than with concentrated acid, and owes its origin to secondary action. 27·5 per cent. acid gives no nitric peroxide, but this gas is the main product if 70 per cent. acid be employed.

The reaction between nitric acid and *aluminium* proceeds very slowly; with 27·5 per cent. acid no ammonia was obtained.

Mercury yields no ammonia with 27 and 50 per cent. acid; the quantity of nitric oxide produced, diminishes as the concentration increases. 27·5 per cent. acid gives no nitric peroxide, but stronger acid yields large quantities just as in the cases of copper and bismuth. Mercurous nitrate is obtained in solution on operating with 25 per cent. acid; more concentrated acid (50–70 per cent.) gives the mercuric salt.

Nitric acid (27·5 per cent.) gives no ammonia with *silver*, but only nitric oxide and nitrous acid.

The amount of ammonia produced in the reaction between *magnesium* and nitric acid increases with the concentration of the latter until 40 per cent. acid is reached, the quantity then decreases. Much hydrogen is formed; the mixture of this gas and nitric oxide liberated by 13 per cent. acid may be exploded by an electric spark.

Ammonia is produced by the action of nitric acid on *manganese;* so much hydrogen is formed that the evolved gas will not explode

until oxygen has been added. Nitrogen and nitrous oxide are also liberated.

In all the previous experiments, excess of nitric acid was employed and the temperature was kept constant (15–20°).

The metals may be classed in three groups, according to their behavior towards nitric acid. To the first group belong those metals which, with nitric acid, yield only nitrous acid, nitric oxide, nitrogen trioxide, and nitric peroxide. Metals of the second group give, besides these products, hyponitrous acid, nitrous oxide, nitrogen and ammonia. In addition to these, metals of the third group liberate hydrogen. It is to be noted that metals belonging to the first group either do not decompose water at all or only at very high temperatures. Metals of the second group decompose water at much lower temperatures, and those of the third group act on water either at ordinary or at comparatively low temperatures. There is hence a relation between the products of the action of nitric acid on metals and the behavior of the metals towards water; this relation supports the author's view that water sometimes takes part in the reaction.

The author considers that the reaction between nitric acid and metals which do not decompose water may be represented by the equation

$$M + 3HNO_3 = M(NO_3)_2 + HNO_2 + H_2O,$$

$$\text{or } M + 4HNO_3 = M(NO_3)_2 + 2NO_2 + 2H_2O,$$

according as the acid used is dilute or concentrated. To explain the formation of nitrogen trioxide, the following equation is employed, $2M + 6HNO_3 = 2M(NO_3)_2 + N_2O_3 + 3H_2O$. When water plays a part in the reaction, a more complex series of equations is necessary.

QUALITATIVE ANALYSIS OF COAL-TAR COLORING MATTERS.[1]

By A. G. Green.

It is of importance to dealers in, as well as manufacturers of, these dyes that they should have the means to match colors, not only in respect to shade, but also in accordance with the chemical constitution of any unknown colors which may be submitted to

[1] Read before the Society of Chemical Industry; Abstract republished from Chemist and Druggist, January 14, 1893, p. 43.

them. The object of Mr. Green's paper was to submit a scheme of analysis formulated into tables, such as are used in qualitative inorganic analysis. Unfortunately, his MS. and proofs of the paper had miscarried, and he was compelled to give a *résumé* of the communication. Taking Weingärtner's scheme as the basis, Mr. Green showed that we may first divide the different colors according to their solubility or insolubility in water; then taking those which are soluble the addition of 10 per cent. aqueous solution of tannin determines whether the color is acid or basic, the latter affording a precipitate and the former none. Next, the behavior of the color with zinc dust, *plus* a sufficiency of hydrochloric acid or ammonia, furnishes another separation into three classes, viz., those which are readily, or slowly, or not at all, reduced. Again, taking those which are reduced, we may separate them into other three groups: (*a*) those which are completely reduced and cannot be reoxidized; (*b*) those which by means of chromic acid are brought back to their original state, or something like it; and (*c*) those which spontaneously reoxidize in the air. Azo colors may also be divided into those which do or do not dye cotton.

Water insoluble colors may be divided into those which are or are not soluble in caustic soda solution, and in regard to their behavior towards zinc dust.

Mr. Green then showed the meeting some of the reactions. Taking three blues—a thiocyanin, a roseaniline derivative, and an azo blue—he showed that all were reduced by zinc and hydrochloric acid, the thiocyanin color reoxidizing quickly, as was evident when some of the solution was placed on a piece of filtering paper; the roseaniline color was seen to be a faint yellow; and the azo color had a red shade. On moistening with chromic acid the roseaniline was still unchanged, but ammonia vapor brought back the blue, whereas with the same oxidizer the azo stain was changed to a secondary color not affected by ammonia. Similar experiments were shown with three red colors, and again distinctive reactions resulted.

It was next stated that sulphuric acid distinguishes between coloring matters chemically different, although belonging to the same group. That was shown by treating three scarlets (alike in shade when dissolved in water)—xylenene dissolved red in the acid, crocein brown-black, and Biebrich's scarlet gave a deep blue.

In concluding, Mr. Green explained the theory of the zinc dust reaction. Taking all these colors as quinone compounds he thought that those which reoxidize readily are ortho-derivatives and those which reoxidize slowly are para-derivatives: magenta (roseaniline) belongs to the latter and phosphine (chrysaniline derivative) to the former.

The discussion consisted mainly of questions.

Dr. Alder Wright asked how far the scheme could be utilized for mixtures of colors. Mr. Bevan wanted to know how to proceed in applying the reactions to colored fabrics. Mr. Blount asked if it was the case that the majority of artificial blues are soluble in alcohol, even when on the fabric, and could this be used as a means of distinguishing between them and indigo.

The Chairman (Mr. W. Thorp) suggested that some indication should be given in the tables of what the chemical nature of the colors is, as the commercial names do not suffice for this.

Mr. Green, in replying, said that it was difficult to analyze mixtures of colors, and his tables did not pretend to do that, but it was often comparatively easy to tell whether a color was a mixture or not. If it be finely ground and a little sprinkled on a piece of wet filtering paper, then held up to the light, it would be seen that the margins of the particles differed in color if there were different dyes present. So also in regard to the behavior of the mixture when a little of it was sprinkled on sulphuric acid, or when the matter of ten swatches of cotton were dipped into the dye-bath under different conditions, or whether wool and cotton behaved differently. These and other methods could be utilized, but it was not possible, he thought, to deal more systematically with mixtures. Colors could be extracted from fabrics with alcohol or carbonate of soda, and the table tests then applied. All basic blue colors could be removed from fabrics by alcohol, but not the acid ones. It was impossible to use either formulæ or constitutional names in the tables, and on the whole the commercial names were most useful in this instance. In reply to Mr. Crowther, he stated that the spectroscope was sometimes useful in this connection, and a very simple way of ascertaining whether a dye was a mixture or not was to allow a little to soak up strips of filtering paper, when by capillarity such a thing as picric acid, for instance, would reveal itself even in a roseaniline solution.

NOTE ON THE INTERACTION OF IODINE AND POTASSIUM CHLORATE.[1]

By T. E. Thorpe, F.R.S., and George H. Perry, Assoc. Roy. Coll. Science.

The interaction of iodine and potassium chlorate, first employed by Berzelius for the preparation of iodine monochloride, is usually represented by the equation

$$3KClO_3 + I_2 = KClO_4 + KCl + KIO_3 + ICl + O_2.$$

We find, however, that when an intimate mixture of iodine and potassium chlorate, in the proportions demanded by the above equation, is heated, not only is the yield of iodine monochloride invariably very far below the theoretical amount, but that much of what actually is formed is converted into the solid trichloride, and that free chlorine and more or less iodic anhydride are often simultaneously formed. These facts seem to show that the actual change is very imperfectly indicated by the equation above given.

Careful quantitative experiments, so arranged that the various products of the change, both fixed and volatile, could be estimated, have shown that, in reality, the primary and main reaction between iodine and potassium chlorate is a simple metathesis: $2KClO_3 + I_2 = 2KIO_3 + Cl_2$. The chlorine so liberated attacks any iodine that is not within the "sphere of action" of the heated chlorate, and forms more or less mono- and tri-chloride of iodine, in amounts depending upon the temperature and mode of heating. When care is taken not to heat the mixture to a higher temperature than is actually necessary to effect the above change, the saline residue contains only traces of potassium chloride and perchlorate, which seems to indicate that these substances are not really products of the direct action, but are formed by local superheating of the chlorate, with evolution, of course, of oxygen, and consequent formation of iodine pentoxide. By careful management, it is possible to convert practically the whole of the iodine present into potassium iodate, with the liberation of the equivalent amount of gaseous chlorine.

Iodine monochloride, as is well known, is readily dissociated by heat into the trichloride and free iodine. It seemed to us interesting to determine whether a solution of iodine monochloride in chloroform or carbon tetrachloride would show any indication of such dissociation when allowed to diffuse into a quantity of the same

[1] *Journal of the Chemical Society*, 1892, p. 925.

solvent. The experiment indicated that no such dissociation occurred, but that the ratio of iodine to chlorine remained unchanged throughout the mass of the solution, a conclusion in harmony with the results of recent work by Stortenbeker reported in *Zeit. Physikal. Chem.*, **10**, 183.

CHLOROFORM.

By D. Brown.

How many varieties of chloroform are required to supply the demands for preparations suitable for anæsthetic and manufacturing purposes?

This is a question which should be asked, and, after careful consideration, answered by all interested in the subject.

It is the general opinion that for manufacturing purposes a fairly pure preparation only is required, and there is an equally unanimous opinion that for anæsthetic purposes a product of the highest degree of purity should alone be employed. There is, however, some difference of opinion among medical men and pharmacists regarding the source from which the latter product should be obtained; some believing that it can be and is produced from pure, as well as from impure, raw materials, while others contend that it can only be produced in a state of purity from pure materials, such as pure spirits of wine or chloral hydrate crystals.

In order to ascertain which of the opinions is the correct one, it will be necessary to state a few facts regarding products obtained from pure and impure materials.

Pure products are obtained from tar, urine and putrid flesh, as well as from many other impure substances. Alkaloids in a state of purity are also extracted from numerous impurities; in some cases from as much as 95 per cent. of extraneous matter, and it is well known that chloroforms in an equal state of purity are produced from pure as well as from impure raw materials. In evidence of this, we know that all attempts which have hitherto been made to determine the origin of pure chloroform have proved failures; and published analyses speak to the purity of alkaloids which have been separated from larger quantities of impurity than chloroform is ever found associated with.

It is evident, therefore, that the quality of the finished products depends not on the character of the raw materials, but on the

thoroughness of the purification to which the crude products have been subjected.

If the character of the finished product is determined by the materials used we should find the products from chloral hydrate and spirits of wine standing alone at the top of the list as the purest of all preparations. Experience shows that they do not occupy this position; products from other and less pure materials being in many cases found to excel them in purity, and in others to be on an equal footing with them. A sample of chloral hydrate chloroform which I lately examined was found to be the most impure of a series representing all the different brands, and the crude product from chloral hydrate to be more impure and more difficult to purify than similar products from impure raw materials; in fact, the production of chloroform from it is, I believe, being abandoned, because of the difficulty experienced in its purification.

So long as it remains impossible to determine the source from which pure chloroform has been obtained, and chloroform prepared from the purest materials is found to contain more impurity than others from impure sources, the advocates of the pure raw material product *as the only pure one* cannot reasonably expect confidence to be placed in their statement, when pure products are known to be obtained from either source; and their position is still further weakened by the fact that they are unable to tell one pure chloroform from another without consulting the label, and even then they may be wrong, if the samples have not been correctly marked.

At present there are chloroforms prepared from at least five different sources, but I have no hesitation in saying that two different brands—which may or may not be prepared from the same material—are all we require; one of the highest degree of purity for anæsthetic purposes, and a second, not so highly purified, for the use of manufacturers.

If what has been said regarding the effects of purification is true—and I think there can be no doubt about it—it is evident that purification is the only factor which determines the quality of all chloroform, and that it has been and is successfully used to level up to a state of equal purity crude products of all kinds.

The purest chloroform therefore must be that which—irrespective of origin—contains the smallest quantity of impurity.—Phar. Jour. and Trans., Decb. 24, 1892, p. 505.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, January 17, 1893.

Wm. B. Webb, Ph.M., was called to the chair, and on motion of Professor Trimble the reading of the minutes of the last meeting was dispensed with.

Professor Remington spoke of the use of sixty per cent. acetic acid in exhausting drugs of their active principles, and exhibited a number of specimens of the fluid preparations thus made, and also the drugs that had been subjected to this treatment. The use of this acid is becoming more important, as it affords a most reliable and economical escape from the exorbitant and increasing tax to which druggists and pharmacists have been subjected through the internal revenue tax on alcohol, and through the recent action of the Whiskey Trust in forcing up the price of whiskey and consequently that of alcohol. The acid may be used for solid as well as for fluid extracts; equal weights of this sixty per cent. acid and water make an acid of the same strength as the No. 8 acetic acid of commerce. It was inquired whether the liquid preparations of the aromatics, and of similar drugs, when mixed with water were clear; this was shown to be the fact.

Messrs. J. Ellwood Lee & Co. exhibited samples of the *aseptic gauzes*, and their improved method of keeping them in that condition; these gauzes are packed in cartons, sterilized by means of a thorough immersion in paraffin; the ligatures, made of sterilized silks, are put on spools and then packed in glass tubes surrounded with alcohol; in withdrawing them through pierced rubber stoppers they are completely dried and ready for use.

Professor Trimble presented, on behalf of Parke, Davis & Co., to the museum a handsome collection of soft capsules. Professor Remington explained the method of making them over bone moulds, great care being necessary in having the proportion of gelatin, glycerin and water just right to produce a film which shall be sufficiently elastic to slip off the mould; the filling is done by means of a burette and pinch-cock.

The following paper was then read by the author:

Some Curious Experiences of a Month in a Drug Store may be said to confirm the wisdom of the college in maintaining the pharmaceutical meetings. It is an admitted fact that all advance workers in professional and mechanical sciences do find no method so prolific of good as the face to face meet and interchange of thought. We are all asked questions upon subjects which are new to us and have not the time, and sometimes not the ability, to investigate or answer. To all such this is a good place to have such problems solved. While it is advisable to read the numerous journals claiming to be exponents of progress and exact knowledge in matters pharmaceutic, it is more than necessary that the busy pharmacist, who finds his time engaged in multitudinous ways of maintaining not only his professional but his mercantile standing, should be able to discriminate when the subject matter is not altogether free from a business bias.

Our neighbors, the grocers, realizing the advantage, hold annually an Exposition, with paid admissions and liberal expenditure of money for demonstrators in the culinary art.

Many of the experiences may not be new, yet not devoid of some interest,

and are recited with the hope of encouraging other members to contribute to the interest of these meetings.

Niccoli bromidum is seldom written, and requires a second look to recognize bromide of nickel.

A box of "*Ace of Spades*" is the name of a shoe polish; but *Flake White* seems innocence itself, and any caution is resisted when statement is made—"it is carbonate of lead and a poison."

By an accident to a boy the crown of a tooth was broken and a splinter of oak wood forced through the body and root of the tooth. Extraction revealed the nature of the injury.

Glass splinters in bottles are of rather frequent occurrence and should be removed at the time the bottles are washed.

When *aniseed* is sold down to bottom of the drawer, the remainder will usually be heavily laden with small fragments of rock and earth.

It is well to remember that *syrup of cubebs* is used as a diluent, and should not be made by mixing fluid extract and syrup.

Some *extract of belladonna* and water when rubbed with an iron spatula gave to the latter a copper coating.

A trade package, labelled ground *belladonna root*, was found to be belladonna leaves.

Information is wanted as to the composition of a red powder called *coaline*; it is sold as an improver of poor coal and to hasten a dull fire.

WILLIAM MCINTYRE.

Mr. Moerk read a paper upon the rapid *assay of hydrogen peroxide*, and showed the process to be a practical one.

Professor Remington showed the method of *preparing hydrogen peroxide* extemporaneously by the use of barium dioxide and syrupy phosphoric acid, the barium dioxide is to be dissolved and the diluted acid is then added gradually with certain precautions; the resultant liquid contains some barium in solution, which is separated by diluted sulphuric acid.

A vote of thanks was passed to the gentlemen having contributed subjects of interest, and the meeting then adjourned.

T. S. WIEGAND, *Registrar.*

EDITORIAL.

The Eleventh International Congress of Medicine will convene in the city of Rome, Italy, September 24, 1893. The provisional committee announces that, in consonance with Articles III and XVII of the General Regulations, pharmacists may be inscribed as members of this Congress, and that a special Section on Pharmacology will be organized by a committee composed of distinguished professors of that branch of science.

The State Pharmaceutical Examining Board of Pennsylvania held an examination in the Central High School at Philadelphia, on Monday, January 16, the candidates numbering 262, namely, 118 for registered pharmacists certificates and 144 for qualified assistants certificates. Forty-four of the former and 90 of the latter class were successful.

At the preceding examinations, held in October in Philadelphia and Pitts-

burg, 36 (out of 129 applicants) were granted registered pharmacists certificates, and 41 (out of 122 applicants) certificates as qualified assistants.

Amendment to the Pennsylvania Pharmacy Law.—On p. 331 of our last volume we recorded the action taken by the Medical Society of the State of Pennsylvania in favor of requiring physicians, who intend to carry on the retail drug business, to pass an examination under the pharmacy law. Governor Pattison, in his message to the legislature, referred to the same matter in a direct and judicious manner, using the following language:

"The act of 1887, regulating the practice of pharmacy, would be rendered more effective by amendment. Section 11 of this act provides that 'Any graduate of any accredited medical college, who has had not less than three years continued practice since the date of his diploma, and who is registered as a practitioner of medicine and surgery, may be registered under the pharmacy act without examination, and be granted a certificate to all the privileges under the provision of the law.' The special training required by the pharmacist can only be had after a term of apprenticeship or a college course, and even after that, he is required to pass an examination. His college certificate does not carry with it the same force and effect as the diploma and experience of the physician. It is recommended that Section 11, of the act of 1887, be repealed, so as to place the demands of registration for all applicants under the pharmacy act on the same footing."

We understand that a bill has been introduced repealing the obnoxious section in conformity with the recommendations of the State Medical Society and of the Governor, and in accordance with the unanimous sentiment of the pharmaceutical profession; and it is to be hoped that none of the legislators may be blind enough not to see the justice of the proposed measure.

The California College of Pharmacy held its nineteenth annual commencement in Odd Fellows Hall, San Francisco, November 10, last, when the diploma of the College was conferred upon 33 candidates, including one lady; and certificates of proficiency were awarded to two ladies and two gentlemen.

The excessive price of alcohol in the United States has been ventilated in a circular recently issued by the Philadelphia Drug Exchange. Commencing with July 1, 1862, the excise tax on proof spirit was 20 cents per gallon; March 7, 1864, it was made 60 cents; June 30, 1864, $1.50; December 22, 1864, $2; July 20, 1868, 50 cents; June 6, 1872, 70 cents, and since March 3, 1875, it is 90 cents per gallon. No reason whatever can be assigned for such a vacillating course. The present tax amounts to $1.692 on a wine gallon of 94 per cent. alcohol; but the customs duty on spirit is $2.50 per *proof* gallon, which is equal to $4 70 per *wine* gallon of 94 per cent. alcohol. It is obvious that this duty is simply prohibitory, and it is no wonder that a "trust" has been formed, virtually monopolizing the trade in distilled spirits, and exacting for these goods any price they choose to exact.

The circular also shows that in May, 1892, alcohol was obtainable at $1.98, net, per gallon. Since the Whiskey Trust was formed, the price has been continually rising, and January 10, last, it was, in 10 barrel lots, $2.64. Under certain restrictions the trust allows a rebate of 7 cents per proof gallon. Deducting the government tax from the price in May last we have $1.98 - 1.692 = 28+$ cents per gallon; while after deducting the government tax and the

trust's rebate (7 cents per *proof* gallon = 13·16 cents per *wine* gallon of 94 per cent. alcohol) we have in the beginning of January 2·64 — (1.692 + .1316) = 81 + cents as the trust price for alcohol; or in other words, under the management of the trust the price of alcohol—exclusive of the government tax—has been almost trebled. And since there is still a margin of over $2 per gallon as compared with the customs duty on imported 94 per cent. alcohol, it is possible that the limit in rise has not yet been reached.

The circular alluded to also calls attention to Great Britain, where the excise duty on home-made spirit is 10*s.* pr. proof gallon, and the customs duty on imported spirit 10*s.* 4*d.* per proof gallon, a difference of 4*d.*, or 8 cents, merely sufficient to compensate for the inconvenience inflicted on home producers.

Moreover, manufacturers in the United Kingdom have the advantage of using methylated spirit (a mixture of alcohol and methylalcohol), free of tax; and in other countries analogous facilities have been afforded, those now adopted in Germany being explained in the following, copied from the *Pharm. Jour. and Trans.*, of January 14, 1893:

"Arrangements have been made in Germany for permitting the use of spirit free of duty for medicinal, pharmaceutical and manufacturing purposes, and the regulations under which this is to be allowable have now been published. The manufacture and supply of duty free spirit will be regulated so as to prevent misuse and keep a control upon its application. Those who desire to avail themselves of the privilege must apply for permission and make a statement as to the purpose for which the spirit will be used, with an estimate of their probable consumption. Users of duty free spirit will have to keep for inspection an account of the quantity used and the purpose for which it is used, and their premises will be examined from time to time. Liquors and all preparations, such as concentrated essence of ginger, cannot be made with duty free spirit in any case; but it is intended to offer facilities for its use in all cases where there is no reason to apprehend interference with the revenue derived from alcoholic preparations which are capable of being used as beverages."

In view of the contrasts shown above, there is evidently much room on this side of the Atlantic for lessening the burden placed upon a necessity for industrial pursuits, and for the prevention of monopolistic practices.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Yearbook of Pharmacy, comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and foreign journals from July 1, 1891, to June 30, 1892. With the transactions of the British Pharmaceutical Conference at the twenty-ninth annual meeting held at Edinburgh, August, 1892. London: J. & A. Churchill. Pp. 560.

The prompt publication of this volume about four months after the meeting is very commendable. On pp. 535 to 546 of our last volume we have given an account of the transactions at the meeting. The yearbook, which is analogous to the "Report on the Progress of Pharmacy" annually published in this country, occupies 252 pages, to which about 20 pages are added, containing lists of books bearing on pharmacy, published during the year.

Charaka-Samhita, translated into English. Published by Abinash Chandra Kaviratna, practitioner of the Hindu System of Medicine, etc, Calcutta.

When noticing the publication of the first fascicle on p. 286 of our last volume, a history of this ancient work was given as far as known, and its importance for the study of medicine in general, and of materia medica in particular, was pointed out. Three fascicles of the English translation are now before us, containing seven lessons which treat of longevity; of drugs and gruels useful in curing diverse diseases; of powdered drugs and plasters; of purgatives and astringents; of proper diet; of food in different seasons, and of the inadvisability of suppressing the urgings of nature. The explanatory annotations, added by the translator, will be especially appreciated by the reader. In this form the work is unquestionably a most valuable addition to the history of medicine in earlier times, made accessible to those who are not conversant with the ancient languages of Eastern countries.

A System of Instruction in Qualitative Chemical Analysis. By Arthur H. Elliott, Ph.D., Professor of Chemistry and Physics, and Director of the chemical laboratory in the College of Pharmacy of the City of New York. Published by the author. 1892. 8vo. Pp. 120.

A very useful and practical work, intended, as stated by the author in the preface, to be used with the living teacher. It treats of reagents and apparatus; of the separation of metals into groups; of the special tests for each metal; of the separation and detection of acids and their special tests; of the preparation of solutions, and finally of several special methods. The effects of reagents are fully described, and many details of manipulation are given and explained which will be appreciated by the students. The different paragraphs are numbered consecutively and conspicuously with the view of facilitating cross references.

Carl Wilhelm Scheele. Nachgelassene Briefe und Aufzeichnungen herausgegeben von A. E. Nordenskiöld. Stockholm: P. A. Norsted & Söner. 1892. Large 8vo. Pp. xliii and 491.

A publication of great historical interest and importance is presented in this volume. The editor, after obtaining some relief from the scientific labors incidental to his voyages in the polar regions, again took up his researches, first begun about thirty years ago, into the history of Scheele's life, and finally succeeded in having copies made of the various original letters, laboratory notes and other papers preserved in the State's archives of Sweden. From the photographic reproductions of one of the letters and of several pages of laboratory notes, it is easily seen that for understanding the former the chief difficulty lies in correctly interpreting the Latin chemical terms and signs used by Scheele. The latter were more largely used by him in his laboratory notes, which are evidently brief memoranda made at the time the experiments were executed. The Latin terms are explained in a table occupying twelve columns, while in another table of four columns the most important signs are translated. The total number of the documents, aside from the laboratory notes, is 135, comprising notes made by Gahn on many experiments made by Scheele, and letters written by the latter to Retzius, Gahn, Bergius, Bergman, Hjelm, Hising and Lavoisier. These documents were mostly written in German, but some were in Swedish and one or two in French. They are published in full, with

but few omissions of unimportant matters having no reference to chemistry, the signs being replaced by the Latin chemical terms used by Scheele. As an introduction to each document its contents are briefly indicated, and the text is in nearly each case followed by brief explanatory notes, frequently of a historical character. The letters are preceded by a biography of Scheele, occupying 28 printed pages, and by a list of the titles of his published essays.

It is impossible to enter in this place into details; but it may be stated that the documentary evidence here produced shows not only the wide extent of his experimental researches, but likewise his clear views and deductions; and it appears that he is doubtless entitled to the honor of being the first discoverer of chemical bodies, other than those that have heretofore been credited to him. Thus it is shown, that during the years 1771 and 1772 Scheele had isolated *oxygen*, which he at first called "aer vitriolicus," from mercuric carbonate, mercuric oxide, silver carbonate, magnesium nitrate and from a mixture of black manganese and arsenic acid. These researches, which included also the chief properties of the gas, preceded Priestley's discovery (August 1, 1774), from two to three years; but they do not in the least detract from the honor due to Priestley for his independent discovery, nor do they lessen the immense value of Lavoisier's researches, upon which the structure of modern chemical science has been erected.

The work has been published both in the Swedish and German languages, the latter version having been prepared by Paul Berndt and revised by Prof. E. von Meyer.

Traité général d'Analyse des Beurres, préparation, caractères, composition, altérations et falsifications; méthode générale d'analyse, discussion et appreciation des résultats. Par A. J. Zune, rédacteur en chef du Moniteur du Praticien. Chez l'auteur, 108 bis, rue de Rennes, Paris; et chez l'imprimeur-éditeur, A. Allard, Braine-l'Alleud, Belgique. Complet en deux volumes; prix, 25 francs.

A general treatise on the analysis of butters. Vol. I. Pp. 490, with 83 illustrations and 63 tables inserted in the text. Vol. II. Pp. 340, with 270 illustrations and 85 tables inserted in the text, and with 14 plates.

These two volumes constitute a very comprehensive and meritorious monograph on butter, its substitutes and adulterations, and their recognition and determination. The first volume is devoted to general considerations which are discussed in ten chapters, beginning with the preparation and conservation of butter and of the numerous artificial compounds used in place of the natural product. In the next four chapters the characteristics of these articles are considered, as organoleptic characters (appearance, consistence, color, odor and taste); physical characters (fusing and solidifying points, density, solubility, etc.); optical characters (crystallization, polarization, etc.), and behavior with various reagents, such as sulphuric acid, nitric acid, silver nitrate, gold chloride, etc. The two following chapters treat of the proximate composition as determined by different authors, viz: fat, water, casein, salt, palmitin, olein, butyrin, etc.; and the subsequent chapter gives an account of the products—the various acids and glycerin—obtained by saponification; while the concluding chapters discuss the processes recommended by various others for the detection of falsifications, and the alterations which occur in butter and other

fats through the influence of air, light and heat, and the changes due to diseases of the cows as well as through faulty processes of manipulation.

The second volume treats of the methods of examination, beginning with the determination of the physical characters of butter and its substitutes, which is followed by the proximate analysis (estimation of matter volatile at 100–110° C., and on ignition; soluble in ether; soluble and insoluble in water; coloring matters), the qualitative and quantitative analysis of the fat, and the microscopic analysis. These chapters are intended to give full descriptions of the complete analysis of natural and artificial butters, and of the impurities which in both kinds of products have been observed to be sometimes present either by design or accidentally. Among these impurities described and figured by the author are not only various salts, coloring matters and starches, but also different bacteria, moulds, vegetable fragments, human and animal hairs and a few animal parasites, which evidently can find their way into such products only through want of cleanliness in preparation and preservation. For practical purposes such a full analysis is not required, but it is of importance to ascertain the character of the product, whether natural or artificial, and whether or not injurious to health. These points are formulated by the author in eight questions, which are then briefly discussed with reference to the results obtained by the analytical methods described in other chapters. A supplementary chapter discusses the results of observations made, and certain analytical methods proposed, while the work was passing through the press.

It will be seen from the above that the field covered by this work is quite an extensive one; and on examination it will be found that nothing of importance pertaining to this matter has been omitted. The descriptions of apparatus, processes and methods are full, and even minute, and though in some cases more prolix than would seem to be necessary, the details are not tedious, and in all cases will be useful in obtaining uniformity of results. The numerous illustrations referred to above give fair representations of the objects; the tables inserted in the book are practical and useful; and types, paper and the general make-up of the work are commendable. It should be mentioned yet that at the close of the different chapters copious references are made to authors and their publications on the subjects discussed.

Proceedings of State Pharmaceutical Associations.

The following have been received during last month:

New Hampshire.—Nineteenth annual meeting held at Keene, Septbr. 6 and 7, 1892. Pp. 90.

For a brief account of the transactions, see p. 546 of the October number. On Septbr. 5 next, the association will meet at Isles of Shoals; Frank L. Way, Manchester, Secretary.

North Carolina.—Thirteenth annual meeting held at Raleigh, August 10 and 11, 1892. Pp. 91.

In addition to the essays mentioned on p. 500 of our September number, papers on the following subjects were presented at this meeting: Compound syrup of hypophosphites; apparatus for dispensing lime water; wine of beef and iron. The next meeting will convene at Winston, August 9 next; F. W. Hancock, Oxford, secretary; F. A. Bobbitt, Winston, local secretary.

Minnesota.—The next meeting will be held June 13 and 14 next at Lake Minnetonka, one of the most attractive summer resorts in the northwest.

Wisconsin.—On p. 52, January number, line 18 from top, for Minnesota read Wisconsin.

Address delivered by President H. M. Whitney at a meeting of the Massachusetts State Pharmaceutical Association held in Springfield, Mass., September 6, 7 and 8, 1892. 8vo. Pp. 21.

A very interesting and forcibly written address, reviewing the work done by the Association and making some very pertinent recommendations.

A Text-book of Practical Therapeutics, with especial reference to the application of remedial measures to disease and their employment upon a rational basis. By Hobart Amory Hare, M.D., B.Sc., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia, etc. Philadelphia: Lea Brothers & Co. 1892. 8vo. Pp. 696. Price, cloth, $3.75; leather, $4.75.

A text-book which necessitates the publication of three editions in two years, has evidently been found to possess qualities which render it especially useful and instructive to those for whose use it has been intended. The plan and scope of the work has been explained before upon the appearance of the two previous editions, and we have also pointed out the care bestowed upon the text so as to render its statements full and reliable. That in this new edition the same attention to all the details has been given, more particularly to the physiological action, the therapeutic uses and the modes of administration, becomes at once evident upon comparing the text with that of the previous issues, not merely by the addition of new matter or recent observations, but likewise by, sometimes slight, changes calculated to render it still clearer or more precise. Among the new compounds introduced we find dermatol, diuretin, europhen, guaiacol, pental, piperazine, strontium salts, terpinol and thiol. That a few erroneous or vague statements relating to the origin of some drugs have crept in, has been noticed on a former occasion; this does not interfere with the primary object of the book to provide the physician or under-graduate of medicine with a reliable guide in the study of therapeutics, or the application of remedial measures for the cure of disease.

Contributions from the U. S. National Herbarium. Vol. I, No. vi. Published by authority of the Secretary of Agriculture.

This pamphlet contains a list of plants collected by C. S. Sheldon and M. A. Carleton in the Indian Territory in 1891, reported by J. M. Holzinger; and a report by M. A. Carleton, assistant botanist of the Kansas Agricultural Experiment Station, on the native plants of Oklahoma and adjacent districts.

Contributions from the Botanical Laboratory of the University of Pennsylvania. 8vo. Pp. 72, and 13 plates.

The first number of this serial contains papers on Rudbeckia hirta and on Brunella vulgaris, by Professor Rothrock; Dionæa Muscipula, by J. M. Macfarlane, and by J. W. Harshberger; Epigæa repens and on the movements of leaves, by W. P. Wilson; and on Mangrove Tannin, by Professor H. Trimble.

An Operation for the radical Cure of Stricture of the Lachrymal Duct, with description of a stricturotome. By Charles Hermon Thomas, M.D., Philadelphia.

Reprint from the Ophthalmic Review, vol. xi.

Report of the Surgeon-General of the Army to the Secretary of War, for the fiscal year ending June 30, 1892. Washington: Government Printing Office. 8vo. Pp. 126 and 13 plates.

The report gives a full account of the work done under the direction of the Surgeon-General and of the health of the military departments and of the various posts. Of particular interest to pharmacists are those portions of the report relating to hospital stewards and to the hospital corps, the latter organized for the twofold purpose of always having on hand, for any emergency, a trained body of sanitary soldiers, and of building up a training school through which, ultimately, all enlisted men of the hospital corps will pass. The plates are illustrations of field equipment, such as ambulance, emergency case, medicine chest, food chest, field furniture, equipment of the hospital corps, etc.

A Study of the Comparative Actions of Antipyrine, Phenacetin and Phenocoll on the circulation and heat phenomena. By David Cerna, M.D., Ph.D., etc., and William S. Carter, M.D., etc.

The essay is the result of researches made in the physiological laboratory of the University of Pennsylvania.

Ueber Salophen und dessen therapeutische Verwendung. Von Dr. Josef Frölich. 8vo. Pp. 18.

On salophen and its therapeutic uses. Reprint from "Wiener Medizinische Wochenschrift." The author, who made his observations in the Vienna General Hospital, considers salophen preferable in acute rheumatic arthritis to sodium salicylate and to salol, owing to its tastelessness, and because its use may be prolonged without producing unpleasant effects.

Trional als Hypnoticum. Von Dr. A. Boettiger. Pp. 13.

Trional as a hypnotic. Reprint from "Berliner klinische Wochenschrift." The observations were made in Prof. Hitzig's clinic at Halle.

OBITUARY.

Professor Jean Léon Soubeiran died at Montpellier, France, December 15, 1892, at the age of 65 years. He was born in Paris, November 27, 1827, and received his scientific training at the Pharmacy School in the same city, where his father Eugène Soubeiran was professor of pharmacy. The deceased graduated from this school in 1853 and 1854, the subjects of his theses on these occasions being "micrographic studies on some starches," and "on the application of botany in pharmacy." He devoted much attention to botany, zoölogy and geology, and to natural sciences in general, but particularly to materia medica. In former years, he wrote valuable essays on cinchona bark, rhubarb, mastic, catechu, isinglass, cod liver oil, etc., and was the author of a creditable work on falsifications and alterations of alimentary and medicinal substances and other products. In 1873, he was called to the chair of pharmacy in the école supérieure connected with the Montpellier University, which position he held at the time of his death. He was also for many years a member of the committee entrusted with the publication of the Journal de Pharmacie et de Chimie. The scientific labors of the deceased were valued at home and abroad, and he was elected correspondent or honorary member by

many societies; among others he was an honorary member of the Philadelphia College of Pharmacy and of the American Pharmaceutical Association.

Notice of the death of the following graduates of the Philadelphia College of Pharmacy has been received:

Elmer Lindsay Cameron, Class 1892, died of consumption, December 22, at his home at Chambersburg, Pa.

James M. Cunningham, Class 1864, died suddenly at the drug store under the Continental Hotel, January 4th, aged 48 years. After graduation he was in business at Pottstown, Pa., and was a member of the legislature of Pennsylvania for Montgomery County during the years 1885 and 1887. Recently he was manager of the store in Philadelphia where he died.

Parker P. Ink, class 1871, died at West Orlando, Fla., November 2, 1892, at the age of forty-five years. He served his apprenticeship at Frederickton, O., and after graduating commenced business at Washington, Ia., acting also for some time as salesman for some western firms. His health failing, he sold his store and moved to Florida about four years ago and engaged in the cultivation of the grape. The mild climate proved beneficial to his health, until a few weeks before his death, he was taken seriously ill with pulmonary consumption. His body was taken to Washington, Ia., for interment.

James P. Milner, class 1865, died October 25 last at his residence, 523 Pine Street, Philadelphia, aged 48 years. After graduating in pharmacy he studied medicine, and at the time of his death conducted the drug business at Sixth and Lombard Streets, in connection with his medical practice.

Edwin Myers, class 1877, died Novbr. 11, last, at his residence, 2856 Germantown Avenue, Philadelphia, at the age of 44 years. He was formerly in business for himself in this city.

Francis Henry Poley, class 1876, died Septbr. 16, 1892, at the age of 38 years, in Norristown, where he was engaged in the drug business.

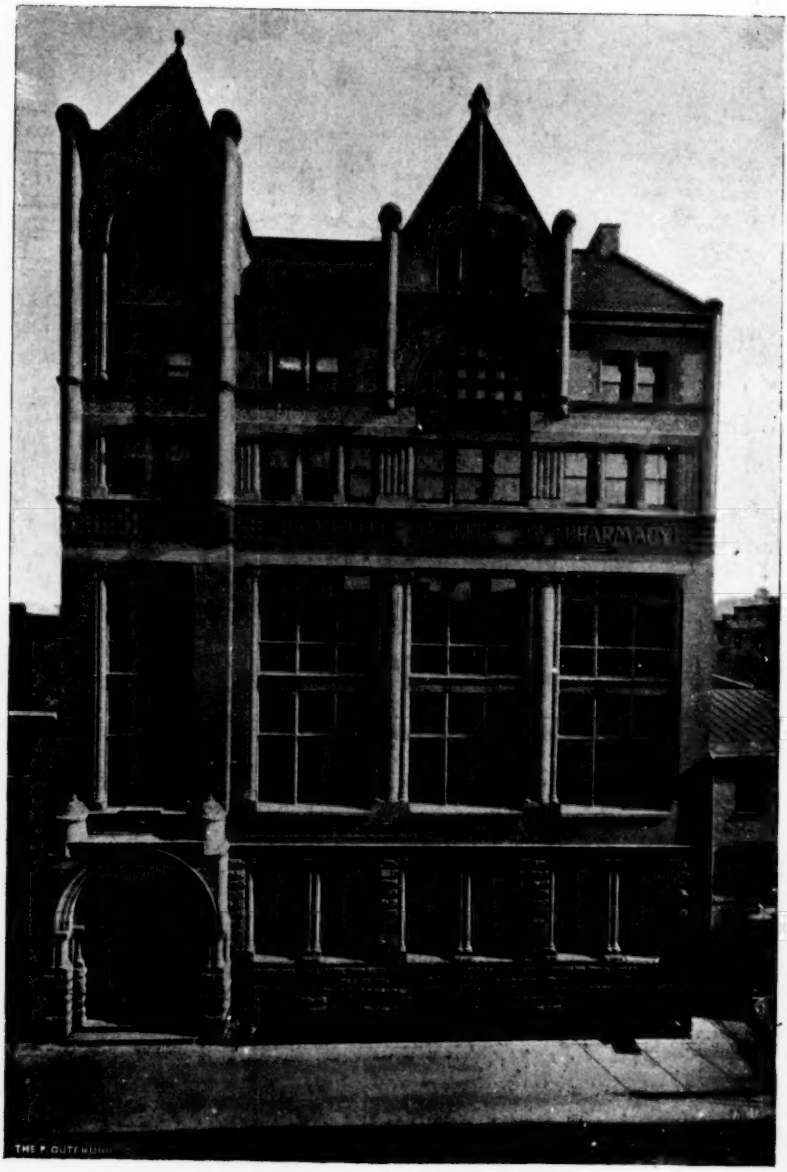
John W. Simes, class 1836, died December 29, last, aged 77 years. His inaugural essay on Solanum Dulcamara was published in this journal, April, 1836. The deceased had carried on the drug business for many years at 22d and Market Streets, Philadelphia, and was the last of three well-known brothers, who formerly were engaged in the drug business in different parts of the same city.

John Wendell, class 1860, died suddenly of heart disease, January 6, aged 54 years. He was formerly in business at Fourth and Brown Streets, Philadelphia, but retired from active business several years ago.

George W. Wolfersberger, class 1887, died Octbr. 21, 1892, while studying medicine at the Jefferson Medical College, in his twenty-eighth year. He was a native of Campbellstown, Pa., and had been in business for himself for a few years at 6th and Vine Streets, Philadelphia.

VARIETIES.

Poisoning by Sulphonal.—Dr. J. B. Marvin reported to the Medico-Chirurgical Society of Louisville the case of a man who had taken on his own prescription, 240 grains of sulphonal in five doses during two days, and died on the evening of the following day.—*Med. and Surg. Rep.*, July 9, 1892, p. 66. See also Amer. Jour. Phar., 1891, p. 424.



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